AMERICAN
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Fifth in a Series†

PRELIMINARY STEPS IN THE DEVELOPMENT OF AN ACCELERATED LABORATORY TEST FOR CHLORINE-RETENTION PROPERTIES IN RESIN-TREATED FABRICS*

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INTRODUCTION

PREVIOUS investigations by Wachter, Davison, and Knight (*1*), and by Wham and Mack (*2, 3, 4*), have shown that, when rayon fabrics finished with melamine- and urea-formaldehyde resins are exposed to low concentrations of chlorine solutions during the laundering operation, there is a pick-up of chlorine by these finishes with a subsequent loss in strength as well as discoloration of the fabric.

The investigation reported herein is based on experiments designed to determine the effect of varying concentrations of chlorine on resin-treated fabrics with and without pressing. This report is confined to a discussion of the results of preliminary experiments, the over-all purpose of which was to obtain data as a basis for setting up a chlorine retention accelerated test.

PLAN OF PROCEDURE

Test specimens were drawn from eight all-viscose rayon fabrics. Three of the fabrics were finished with urea-formaldehyde resins, two with melamine-formaldehyde resins, and three comparable control fabrics were finished without the use of synthetic resins.

Samples from the resin-treated and nonresin-treated fabrics were placed in sodium hypochlorite solutions at 140°F, containing 0.015 percent, 0.13 percent, and 0.5 percent available chlorine, respectively. The specimens were agitated vigorously with glass stirring rods for 10 minutes. They were then removed from the three chlorine baths and rinsed thoroughly five times in distilled water, after which they were allowed to dry in the air.

One-half of each sample then was pressed directly with a hand iron, which was maintained at a temperature of 400° ± 5°F. A variac was used to control the flow of electricity to the iron; and the temperature of the ironing surface was checked with a calibrated pyrometer each 20 seconds during the pressing operation. These precautions were taken to insure a constant temperature at the surface of the iron that came in contact with the specimens.

Both dry and wet ravel-strip breaking strength tests, as well as bursting strength tests, were run on both the pressed and unpressed samples. Strength losses were calculated on the strength per thread basis.

FINDINGS AND DISCUSSION

Table I gives the data of the study. Figure 1 shows the comparisons of strength changes of the melamine-formaldehyde and control fabrics treated with three chlorine concentrations, with and without subsequent pressing at 400°F. Figure 2 gives similar data for the urea-formaldehyde and control fabrics.

In general the higher the concentration of chlorine in the sodium hypochlorite bath, the greater the strength losses. This was true both for the resin finished and nonresin-treated fabrics. The resin-finished fabrics generally showed greater strength losses than did their comparable controls in all of the treatments, the lowest concentration showing a narrower spread between the resin-treated and the control fabrics than did the other concentrations.

This series of tests showed in the main that pressing is not a major factor in causing strength losses in the resin- and nonresin-finished fabrics, since losses sometimes were greater in the specimens that were pressed and sometimes in the unpressed fabrics. Yellowing of the white areas tended to be marked in the resin-treated fabrics and slight or absent in the nonresin-finished swatches, although there was a tendency toward scorching at this temperature (400°F) in some cases. The problem of yellowing will be reported in a later paper of this series.

This is the fifth in a series of reports on chlorine retention by textile finishes, sponsored by the American Viscose Corporation through a fellowship conducted at the Ellen H Richards Institute, School of Chemistry and Physics, The Pennsylvania State College, and currently at the College of Household Arts and Sciences, Texas State College for Women.

* The investigation upon which this report is based was conducted in major part while Dr Wham was a research faculty member of the Ellen H Richards Institute, School of Chemistry and Physics, The Pennsylvania State College, and concluded after he joined the faculty of the Texas State College for Women.

† The fourth article of this series, which appeared in the previous issue should have been correctly titled "Chlorine-Retentive Properties of Resin-Finished Rayon Fabrics. Part C— Color Changes in Melamine-Formaldehyde Resin-Finished Rayons."

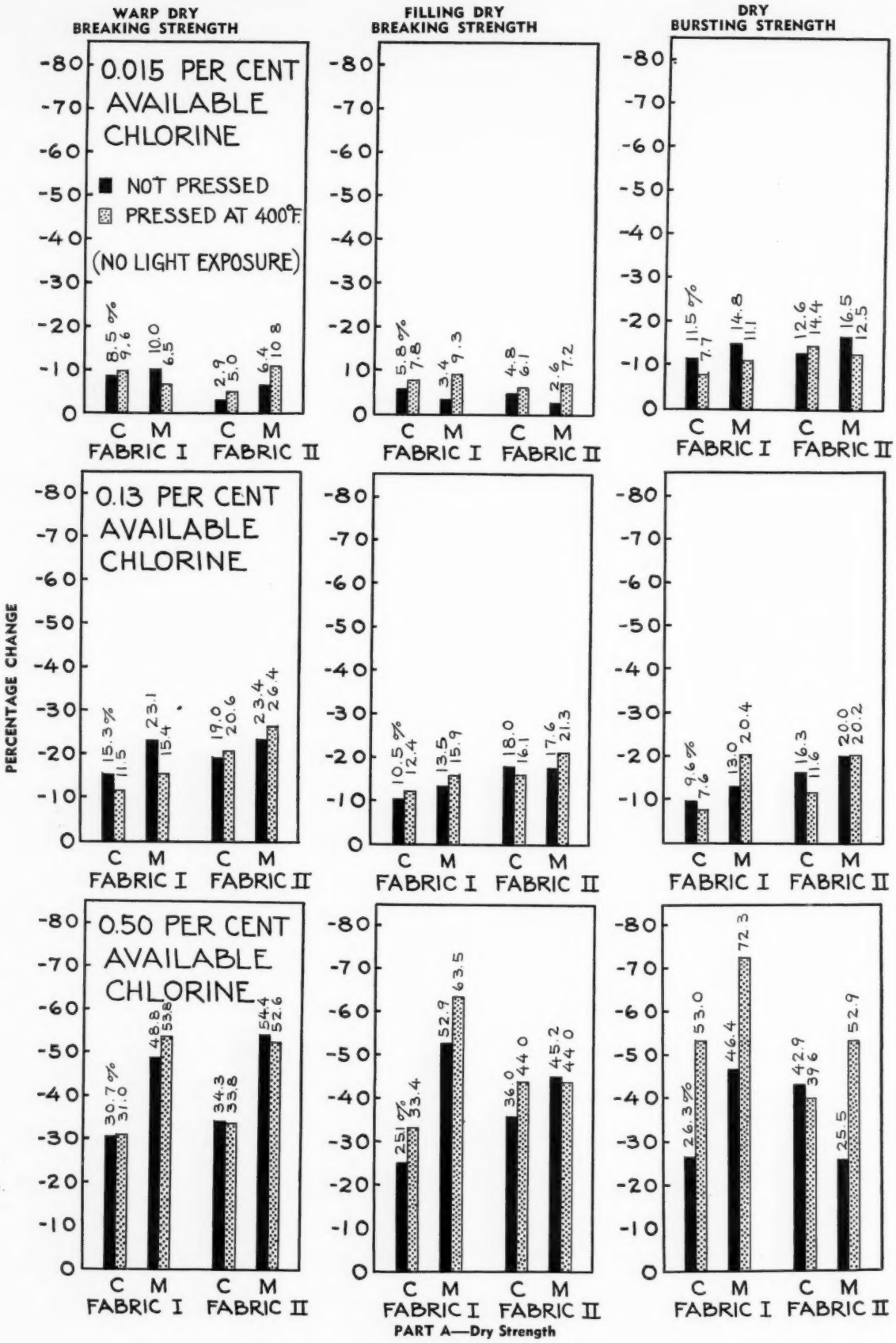
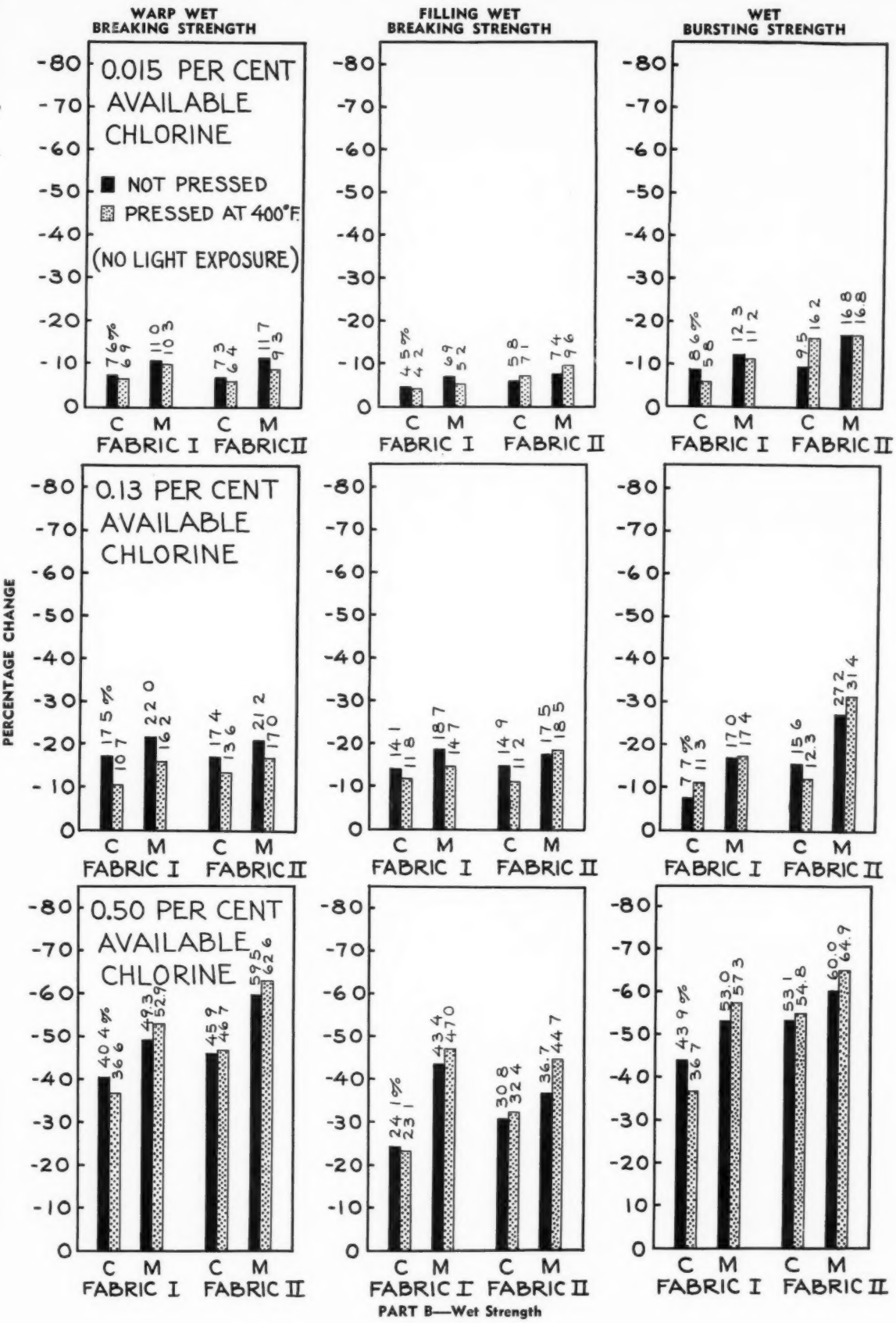


Figure 1A

Comparison of dry strength losses in melamine-formaldehyde resin-finished and control fabrics after laboratory treatment with three respective concentrations of chlorine solution, with and without pressing at 400°F.



PART B—Wet Strength

Figure 1B

Comparison of wet strength losses in melamine-formaldehyde resin-finished and control fabrics after laboratory treatment with three respective concentrations of chlorine solution, with and without pressing at 400°F.

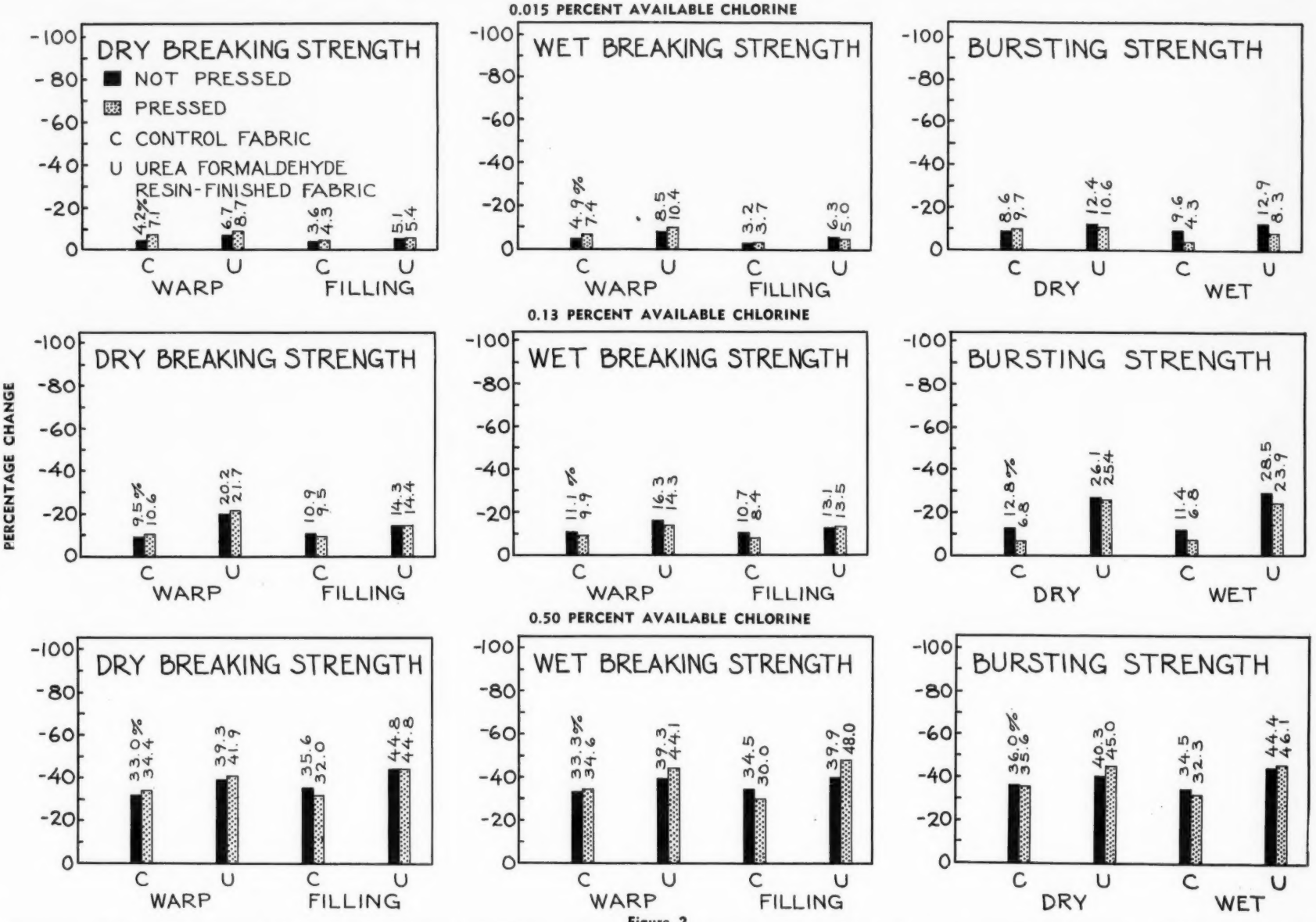


Figure 2
Comparison of dry and wet strength losses in urea-formaldehyde resin-finished and control fabrics after laboratory treatment with three respective concentrations of chlorine solution, with and without pressing at 400°F.

Figure 2
Comparison of dry and wet strength losses in urea-formaldehyde resin-finished and control fabrics after laboratory treatment with three respective concentrations of chlorine solution, with and without pressing at 400° F.

TABLE I

PERCENTAGE LOSSES IN STRENGTH OF EXPERIMENTAL FABRICS AFTER TREATMENT WITH VARYING CHLORINE CONCENTRATIONS WITH AND WITHOUT PRESSING AT 400°F

Fabrics	Dry breaking strength: Pressed at 400° F	Dry breaking strength: Not pressed	Wet breaking strength: Pressed at 400° F	Wet breaking strength: Not pressed
0.015 Per Cent Chlorine Concentration				
urea*				
warp	8.7	6.7	10.4	8.5
filling	5.4	5.1	5.0	6.3
control				
warp	7.1	4.2	7.4	4.9
filling	4.3	3.6	3.7	3.2
melamine fabric #1				
warp	6.5	10.0	10.3	11.0
filling	9.3	3.4	5.2	6.9
control				
warp	9.6	8.5	6.9	7.0
filling	7.8	5.8	4.2	4.5
melamine fabric #2				
warp	10.8	6.4	9.3	11.7
filling	7.2	2.6	9.6	7.4
control				
warp	5.0	2.9	6.4	7.3
filling	6.1	4.8	7.1	5.8
0.13 Per Cent Chlorine Concentration				
urea				
warp	21.7	20.2	14.3	16.3
filling	14.4	14.3	13.5	13.1
control				
warp	10.6	9.5	9.9	11.1
filling	9.5	10.9	8.4	10.7
melamine fabric #1				
warp	15.4	23.1	16.2	22.0
filling	15.9	13.5	14.7	18.7
control				
warp	11.5	15.3	10.7	17.5
filling	12.4	10.5	11.8	14.1
melamine fabric #2				
warp	26.4	23.4	17.0	21.2
filling	21.3	17.6	18.5	17.5
control				
warp	20.6	19.0	13.6	17.4
filling	16.1	18.0	11.2	14.9
0.5 Per Cent Chlorine Concentration				
urea				
warp	41.9	39.3	44.1	39.3
filling	44.8	44.8	48.0	39.9
control				
warp	34.4	33.0	34.6	33.3
filling	32.0	35.6	30.0	34.5
melamine fabric #1				
warp	53.8	48.8	52.9	49.3
filling	63.5	52.9	47.0	43.4
control				
warp	31.0	30.7	36.6	40.4
filling	33.4	25.1	23.1	24.1
melamine fabric #2				
warp	52.6	54.4	62.6	59.5
filling	44.0	45.2	44.7	36.7
control				
warp	33.8	34.3	46.7	45.9
filling	44.0	36.0	32.4	30.8

Fabrics	Dry bursting strength: Pressed at 400° F	Dry bursting strength: Not pressed	Wet bursting strength: Pressed at 400° F	Wet bursting strength: Not pressed
0.015 Per Cent Chlorine Concentration				
urea*	10.6	12.4	8.3	12.9
control	9.7	8.6	4.3	9.6
melamine fabric #1	11.1	14.8	11.2	12.3
control	7.7	11.5	5.8	8.6
melamine fabric #2	12.5	16.5	16.8	16.8
control	14.4	12.6	16.2	9.5
0.13 Per Cent Chlorine Concentration				
urea	25.4	26.1	23.9	28.5
control	6.8	12.8	6.8	11.4
melamine fabric #1	20.4	13.0	17.4	17.0
control	7.6	9.6	11.3	7.7
melamine fabric #2	20.2	20.0	31.4	27.2
control	11.6	16.3	12.3	15.6
0.5 Per Cent Chlorine Concentration				
urea	45.0	40.3	46.1	44.4
control	35.6	36.0	32.3	34.5
melamine fabric #1	72.3	46.4	57.3	53.0
control	53.0	26.3	36.7	43.9
melamine fabric #2	52.9	25.5	64.9	60.0
control	39.6	42.9	54.8	53.1

* Average of three urea-formaldehyde finished rayon gabardine fabrics.

It was noted that the dipping of the fabrics in the chlorine solutions at any of the concentrations studied did not give the order of magnitude of losses in strength as those found after 10 or more launderings in the power laundry followed by intermittent light exposures, in the majority of cases, as was reported in previous papers of this series (*1, 2, 3, 4*).

Thus, it would appear that light is a factor in accentuating the strength losses resulting from the retention of chlorine by urea- and melamine-formaldehyde-finished fabrics, and that exposure to light should be included in an accelerated test to determine the chlorine retentive property of resin-treated fabrics.

SUMMARY

This study shows that it is possible to develop an accelerated laboratory test for chlorine retention by resin-treated cellulose fabrics. That this is possible is supported by the fact that greater strength losses were obtained in resin-treated than in nonresin-treated fabrics when they were submerged in a series of solutions containing varying amounts of available chlorine. Whereas pressing of the chlorine-treated samples generally showed yellowing in white areas of the resin-finished fabrics, with little or no change in the control specimens, pressing showed no trends with respect to strength losses in the paired control groups of fabrics.

Although the resin-treated fabrics exhibited greater strength losses than their nonresin-finished controls, the strength losses were not as great as those found in practical laundry trials involving small concentrations of chlorine with intermittent light exposure in most cases. A further step in the development of an accelerated laboratory test method, which will stimulate service conditions, therefore seems desirable.

ACKNOWLEDGMENTS

The author is deeply indebted to Frederic Bonnet, Arthur Wachter and Ralph Reigner of the American Viscose Corporation, and to Pauline Beery Mack, former director of the Ellen H Richards Institute at The Pennsylvania State College, and Dean of the College of Household Arts and Sciences at Texas State College for Women.

BIBLIOGRAPHY

(1) Wachter, A H, Davison, S and Knight, M K, *Am Dyestuff Reptr* 42, 261 (1953).
(2) Wham, G S, Jr and Mack, P B *ibid* 42, 285 (1953).
(3) Wham, G S, Jr and Mack, P B, *ibid* 42, 328 (1953).
(4) Wham, G S, Jr and Mack, P B, *ibid* 42, 360 (1953).

• PATENT DIGEST •

PAUL WENGRAF

NONWOVEN CELLULOSIC FABRICS Treated with Resin Colloids G, 2, 01

US Pat 2,617,744
(American Cyanamid——Dixon——Nov 11, 1952)

Nonwoven cellulosic fabrics are typified by a product known by the tradename "Cotton Masslinn", which consists of cotton fibers arranged in parallel direction and bonded together in certain intervals by a thermoplastic resin of the polyvinylacetate group. The resin generally constitutes 6-10% of the fabric's weight; obviously the tensile strength of fabrics of this kind in the direction perpendicular to the parallel threads is very low. The present invention is designed to increase the tensile strength of these fabrics *in both directions.*

This can be attained by treating the fabrics with colloidal aqueous solutions of a polymerized aldehyde-urea condensate. Resins used in this process may be of the urea-formaldehyde type, adjusted to pH 8.5 and boiled gently for a short time with ammonium acetate. Other colloidal solutions are prepared from formaldehyde and urea, modified with polyamines or with metabisulfite. The use of urea-formaldehyde resins that can be converted into a colloidal solution of the polymer resin is essential. Most of the resins useful for this purpose are of cationic nature. It is believed that the colloidal resin solution extracts and/or redistributes the polyvinylacetate resin used as a binder.

An analogous treatment with *non-colloidal* dimethylolurea and an acid liberating catalyst has the effect of decreasing the tensile strength.

References cited by the Patent Office:

US Pat 2,407,376 (American Cyanamid/1946): aqueous solutions of dimethylol urea and ethers thereof can be converted to a partially polymerized colloidal state by an SO_2-treatment; the solutions are used for impregnating wool felt and the like.

US Pat 2,334,545 (General Electric/1943): self-curing aminoplasts may be produced by condensing urea, formaldehyde and a mono salt of a polyamine, e g, ethylene diamine mono hydrochloride, to obtain resin intermediates for coating or molding purposes.

US Pat 2,173,243 (U S Rubber Co/1939): treatment of fibers at the isoelectric point with a dispersion of a pigment, a resin, etc, in the presence of a protective colloid under such conditions that the dispersion is "sorbed" by the fabric but not coagulated during impregnation.

INDIGOSOL DYEINGS ON ANIMAL FIBERS——Urea in Acid Solutions C, 4, 03

USPat 2,618,529
(General Dyestuff Corporation——Luttringhaus et al——Nov 10, 1952)

Indigosol dyeings on wool hitherto have been carried out by two methods: either the dye is padded in the presence of an agent which liberates acid in steaming and is then reoxidized by acid oxidation, or the oxidizing agents are included in the padding solutions and rendered effective by an aftertreatment which effects development of the shade. Both methods have been found to have certain disadvantages: the first requires long steaming, thus precluding continuous operations; the second impairs the solubility (and hence the concentration of the dye) all the more as acid splitting agents have to be included in the solution. Furthermore, concentrated solutions of the Indigosol dyes tend to oxidize rapidly, which decreases the yield as well as the fastness to washing and fulling.

Most of the Indigosol brands are best reoxidized with acid dichromate solutions to which thiocyanates may be added optionally. Some of the brands, however, are apt to be overoxidized in this process; it has been customary in this event to employ sodium nitrite and sulfuric acid as oxidants. On the other hand, some leuco esters salts cannot be developed by nitrite-sulfuric acid. Hence the desirability of a method *equally suitable for all Indigosol brands.*

A solution to this problem has been found by padding (or printing) high concentrated solutions of Indigosol dyes by a method which incorporates up to 10% of urea as well as 0.3-0.5 of an acid (phosphoric, sulfamic, lactic, citric, tartaric), but which is otherwise free of salts or other strong electrolytes. After a short steaming the color is rapidly developed in an acid dichromate bath at 180-212°F (e g, within 0.5-3 minutes at 200-212°F). The dye does not bleed into the bath or on to white wool.

An additional effect may be obtained by replacing the sulfuric acid of the dichromate solution with *phosphoric acid.* Overoxidation is said to be substantially prevented while the various fastnesses are improved. Although a slight yellowish-green discoloration may normally result from this treatment, it can be avoided by adding relatively large amounts of sodium chloride to the developing bath (optionally, by separate aftertreatment in an aqueous NaCl solution).

Example: an aqueous solution containing a mixture of Indigosol O4B, Indigosol 06B and an Indigosol of the thioindigo group, as well as urea and some phosphoric acid, is padded on wool, steamed for 4-6 minutes and developed at 200-212°F in dichromate-phosphoric acid. A deep navy blue, fast to fulling, washing and light, is obtained. (Optionally, any green-yellowish discoloration may be removed by a sodium chloride treatment, as mentioned above.) The padding solution remains clear for several days. It may be observed that urea has an antioxidant and solubilizing effect in the presence of phosphoric acid, but this effect disappears in the presence of strong electrolytes, such as acid liberating salts.

Among the references cited by the Patent Office:

USPat 2,432,041 (Durand & Huguenin/1947): printing Indigosols in the presence of urea and an addition product of a lower alkylsulfate on a tertiary base, e g, the tri-ether of triethanolamine. [Cf *Am Dyestuff Reptr 37,* 246 (1948)]

USPat 2,437,554 (Durand & Huguenin/1948): printing textiles with Indigosols, using a paste containing water-soluble acid amides (urea) and a sulfobetaine of a quaternary ammonium compound or methyl pyridinium- or pyridine betaine. [Cf *Am Dyestuff Reptr 37,* 475 (1948)]

USPat 2,122,113 (Durand & Huguenin/1938) and French P 792,611 (same company/1935): preparing stable pastes and compositions in powder form from Indigosols with alkalies and glue, dextrine, glucose or sulfite waste liquor as protective agents.

For the dyeing of wool, Brit P 255,501 advocates the addition of Fullers Earth to the dyebath containing acid, mordant or Indigosol dyes. Brit P 267,986 (Durand and Huguenin/1927) advocates the addition of Fuller's Earth to the oxidizing liquid rather than the dyebath.

Proceedings of the
American Association of Textile Chemists and Colorists

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Editor of Proceedings: Carl Z Draves, 30 Lahey St, New Hyde Park, N Y

June 22, 1953

EMPLOYMENT REGISTER

This column is open for two insertions per year, per member, without charge. Blanks can be obtained from, and filed with, the Secretary of the Association, Lowell Textile Institute, Lowell, Mass. It is understood that these will be open to inspection by prospective employers who can obtain further information from the Secretary.

53-11

Education: B S in chemistry and dyeing, Philadelphia Textile Institute.
Experience: Textile chemist and dyer of woolen and worsted pieces, yarn & top.
Age: 30; married; technical sales or production position preferred. 6-8, 6-22

53-13

Education: B A, Chemistry, with two years graduate work in chemical engineering, plastics and business administration.
Experience: Salesman and engineer.
Age: 33; unmarried; references; position in sales management desired. 6-8, 6-22

—♦ ♦—

Report of Spring Meeting—South Central Section

May 23, 1953
Patten Hotel, Chattanooga, Tenn

The Spring meeting of the South Central Section, held at the Patten Hotel in Chattanooga, Tenn, on May 23, 1953, attracted 45 members and guests to the afternoon technical session and 75 to the evening banquet and business session.

Ernest L Caswell, Ciba Co, Inc, speaker of the afternoon, delivered a paper on "Vat Dyeing on Packages".

Chattanooga City Commissioner George McInturff was guest speaker at the banquet.

E Jurczak, Outing Chairman, reported on plans for the Annual Outing, which will be held August 21-22 at the Chattanooga Golf & Country Club. Reports by the Secretary and Treasurer were accepted as read.

Respectfully submitted,
JOE T BOHANNON, *Secretary*

CALENDAR

AATCC

NATIONAL CONVENTIONS
September 17-19, 1953 (Hotel Conrad Hilton, Chicago); Sept 15-18, 1954 (Atlanta Biltmore, Atlanta, Ga); Sept 21-23, 1955 (Chalfonte-Haddon Hall, Atlantic City, N J).

MID-WEST SECTION
November 7, February 13 (Hotel Bismarck, Chicago, Ill.)

NEW YORK SECTION
Sept 25, Oct 3, Nov 20 (Swiss Chalet); Jan 29, Feb 26 (Hotel Statler, N Y); April 23, 1954, May 21, 1954 (Swiss Chalet).

NORTHERN NEW ENGLAND SECTION
Nov 6 (LTI); Dec 4 (MIT Faculty House).

PHILADELPHIA SECTION
Sept 11, Oct 23 (Penn-Sheraton Hotel, Philadelphia, Pa); Dec 4; Jan 15, 1954.

PIEDMONT SECTION
Sept 12 (Hotel Charlotte, Charlotte, N C).

RHODE ISLAND SECTION
Oct 23 (Prov Eng Soc); Dec 4 (Annual Meeting, Sheraton-Biltmore, Providence).

SOUTH CENTRAL SECTION
Aug 21-22 (Outing, Chattanooga Golf & Country Club, Chattanooga, Tenn); Dec 5 (Patten Hotel).

WESTERN NEW ENGLAND SECTION
Oct 2, Nov 6 and Dec 11 (Rapp's Restaurant, Shelton, Conn).

OTHER EVENTS

AMERICAN OIL CHEMISTS' SOCIETY
27th Fall Meeting, November 2-4, Sherman Hotel, Chicago, Ill.

AMERICAN SOCIETY FOR TESTING MATERIALS
1953 Annual Meeting, June 29-July 3, Chalfonte-Haddon Hall, Atlantic City, N J; 1953 Fall Meeting, Oct 14-16, New York, N Y.

AMERICAN TEXTILE MACHINERY ASSOCIATION
Exhibit of American Textile Machinery, April 26-May 1, Atlantic City Exhibition Hall, Atlantic City, N J.

ASSOCIATION OF CONSULTING CHEMISTS AND CHEMICAL ENGINEERS, INC
Annual Meeting—25th Anniversary-October 27 (Hotel Belmont Plaza, New York).

GORDON RESEARCH CONFERENCES
June 16-Sept 4 (Colby Jr College, New London, N H).

INTERNATIONAL FEDERATION OF ASSOCIATIONS OF TEXTILE CHEMISTS AND COLORISTS
1953 Congress: September 17-19, Luzern, Switzerland (under the auspices of the Swiss Association of Chemists-Colorists).

INTERNATIONAL UNION OF LEATHER CHEMISTS SOCIETIES
Barcelona Conference, Sept 13-18, Barcelona, Spain.

NEW YORK BOARD OF TRADE (DCAT)
Drug, Chemical and Allied Trades Section; 63rd Annual Meeting, Sept 24-27, Pocono Manor Inn, Pocono Manor, Pa; 28th Annual Dinner, March 4 (Waldorf-Astoria, New York, N Y).

PHI PSI FRATERNITY
51st Annual Convention, Feb 25-27 (The Carolina, Pinehurst, N C).

SOUTHERN TEXTILE EXPOSITION
October 4-9 (Textile Hall, Greenville, S C)

TEXTILE RESEARCH INSTITUTE
1953 Annual Meeting, Nov 12-13.

EXHIBIT SPACE AT 1953 CONVENTION

Although a few exhibit spaces are still available at the Convention, July 1st has been set as a deadline for applications. Those still desiring space should address applications to the Exhibit Chairman:

Samuel Klein
Calco Chemical Division
American Cyanamid Company
3505 N Kimball Avenue
Chicago 18, Illinois

Research Newsletter

NEWS IN GENERAL

If you haven't been seeing these Newsletters before it's because this is the first appearance of this new information medium on AATCC research activities. We hope you like it and will tell us so.

The 176th meeting of the Technical Committee on Research and meetings of the Executive Committee on Research and research subcommittees were held at the Willard Hotel in Washington, D C, on June 4th and 5th. Highlights of the event were a Bill Appel-conducted tour of the U S Bureau of Standards labs and the new Washington Section's welcome at its meeting Friday night.

The 5th issue of AATCC's Textile Bulletin to Corporate Members was mailed on June 10th. It contained a complete listing by subject and date of issue of all Intersectional Contest Papers published to date; also a special paper-bound compilation of AATCC Test Methods.

President J Robert Bonnar, Leonard S Little, Chairman of ECR, and Assistant Treasurer Albert E Sampson met in Boston on May 28th to consider the matter of AATCC research operations in relation to the Association's financial picture. Some changes in the presentation of this information will doubtless be forthcoming.

AT RESEARCH HEADQUARTERS

Sets of both the British and German Grey Scales were mailed recently to all Chairmen of Research Committees for the purpose of studying their use in estimating color change and staining. The scales are under consideration for use in the proposed International Colorfastness Standards.

Summer always presents a problem of steam supply required to operate AATCC equipment. Steam is ordinarily supplied by Lowell Textile Institute but in slack periods steam is shut off. Auxiliary generating facilities are being considered to prevent any slackening in research schedules.

AATCC Research Associate G J Mandikos, assigned to the Committee on Simplified Control Tests, has come up with a gas-fade test which appears to have considerable merit. The test is based upon a method suggested by Albert L Polese, formerly of A M Tenney Associates, Inc. It produces, in two minutes, fading equivalent to one cycle by the longer, more precise, standard gas-chamber method which takes 12 hours. The new method is intended for screening purposes only, as in the case of rapid control tests already established for washing and perspiration.

COMMITTEE ACTIVITIES

The pressing need for a standard method of testing antistatic finishes is being tackled by a new committee headed by Kenneth Barnard of Calco Chemical Div. These finishes are of growing importance because of their extensive use in the newer hydrophobic fibers and what the committee is seeking to provide is an acceptable laboratory procedure for evaluating their performance.

A personnel shift occurred in the Committee on Drycleaning Test Methods with the naming of Dr W E Coughlin by Dr A F Tesi to take his place. Doc C recently rejoined Celanese Corp to take over laundering and drycleaning problems so the shift was a logical one.

The Washfastness Committee has submitted its recommendations covering methods for testing color fastness to commercial laundering and domestic washing for presentation to the ISO for consideration as International Standards. This followed an agreement reached at a meeting of American and foreign delegations last November that AATCC could submit recommendations in the matter of laundering tests.

NOW IN PRODUCTION

THE SECOND EDITION

of

THE COLOUR INDEX

The Society of Dyers and Colourists
and
The American Association of Textile Chemists and Colorists

have pleasure in announcing that the
Second Edition of the COLOUR INDEX, *in five volumes,*
will be published in 1955

The work has been completely re-designed and brought up-to-date with the co-operation of all the dye manufacturers in Great Britain, America, Western Europe, India and Japan. The 2nd Edition will be in three main parts.

PART I—will be in three volumes each of approximately 1,000 pages. It will deal with all commercially homogeneous dyes and pigments in current use (approximately 5,000 dye entities and 25,000 commercial names) within groups relating to their main usage, e g, Acetate, Acid, Azoic, Direct Pigment, Solvent, etc. The data included will comprise the commercial name and manufacturer's initials, methods of application, fastness properties, established usages, reactions on the fiber and literature references relating to application. In the absence of a single accepted international system of fastness assessment it has been necessary, in this Edition, to make provision for the inclusion of data according to one or more of the following—

A—(American) The methods of The American Association of Textile Chemists and Colorists.
B—(British) The methods of The Society of Dyers and Colourists.
C—(Continental) The methods of The Deutsche Echtheitskommission.

An important feature of PART I is the sub-division of each usage group into hue groups—Yellow, Orange, Red, Violet, Blue, Green, Brown and Black. The hue classification has been made by reference to a Hue Indication Chart which has been designed specially for the purpose. A copy of the chart will be included with each set of volumes.
Each dye or group of identical dyes carries a PART I serial name and number, e.g. **C.I. Vat Orange 1,** and also a five digit PART II number in those cases where the chemical constitution of the dye is known.

PART II—will be one volume of approximately 700 pages. It will contain data relating to chemical constitution, method of preparation, patent and literature references relating to manufacture or constitution, solubilities and reactions in substance for approximately 3,800 dyes and pigments. The 1st Edition recorded 1,316 constitutions, and this very big increase is partly due to the fact that many co-operating dye manufacturers have, for the first time, disclosed the constitution of certain of their dyes. In addition there is the information contained in the reports compiled by Allied Investigating Commissions on the German Dyestuff Industry.
The dyes are arranged in order based on their chemical constitution following broadly the lines of the 1st Edition. A number of refinements have been introduced and there are two new sections, viz—AZOIC (the coupling components and the diazo components for the production of Insoluble Azo dyes on the fiber and PHTHALOCYANINE.
Each entry will carry a five digit reference number. These numbers will not progress in unit steps as provision has been made to allow of insertion of new constitutions in later editions or supplements without having to change the numbers now allocated in the 2nd Edition. Each entry also carries the complementary PART I serial name and number thus providing easy cross reference to the data in PART I. It will also contain alphabetical and empirical formula indexes to all the Intermediates relating to individual dye entities.

PART III—will be one volume of approximately 400 pages containing the general index to PART I and PART II (see CONTENTS). The Commercial Names Index will include the names (in italics) of dyes not in current use, many of which will be related to data in PART I and/or PART II. It will also include the names (marked*) of dyes now disclosed by the manufacturers as standardized mixtures.

EXAMPLE OF ENTRY IN PART I

C.I. 69025 Anthraquinone **C.I. Vat Orange 1**

APPLICATION DYEING

METHOD
A/Q1 ☐
A/Q2 ■
A/Q3 ◘
Indigoid ☐

LEUCO COMPOUND
Alkaline, orange brown
Acid, brownish yellow

PROPERTIES (COTTON) Affinity and levelling, good. For data on strike, levelling and migration see *J.S.D.C.*, **66** (1950), 505
Suitable for pigment pad-jig, pad-steam, continuous piece and vat-acid processes

Vat in short liquor

Cotton Affinity and levelling good. Dead cotton covered fairly well

Viscose Good affinity at low temperature; at high temperature the hue is redder and duller

Cotton/Viscose Good solidity when dyed cold. At 50°C viscose dyed heavier than cotton

Silk Suitable

PRINTING

Cellulose Applied by normal processes giving redder and duller hues than when dyed. Dischargeable in pale and medium shades in the presence of an assistant

FASTNESS PROPERTIES etc

	A	B	C
CROSS DYEING (Chrome)	..	5	5
HOT PRESSING ...	5	5	5
HYPOCHLORITE ...	5	5	5
LIGHT ⅓–½ Normal	5–6	6	6
Normal	6–7	6–7	6
2× Normal	..	7	6–7

	A	B	C
MERCERISING ...	5	5	5
PEROXIDE BLEACHING	5	5	5
SODA BOIL (open kier)	4–5	5	5
SODA BOIL followed by HYPOCHLORITE ... (Combined test)	4–5	4–5	..

Tendering on exposure to light not accelerated

FASTNESS ON SILK (B) Degumming 5, Hot pressing 5, Light 6–7, Peroxide bleaching 4–5

TEXTILE USAGE DYEING

Cellulose On account of good level dyeing and all-round fastness as a shading colour where good light fastness is required. Suitable for curtains, hangings and for goods to be bleached, e.g. shirtings and towels

Silk For good fastness to degumming, peroxide bleaching and washing

Unions For cotton/viscose fabrics

PRINTING

Cellulose For direct print styles or as pigment with binder on cotton and viscose

HUE **Yellowish Orange**
ARTIFICIAL LIGHT: redder

Benzadone Gold Orange 3G ... ... **YDC**
Caledon Gold Orange 3G ... ... **ICI**
Carbanthrene Golden Orange 3G ... **NAC**
Cibanone Golden Orange 3G ... ... **Ciba**
Cibanone Golden Orange 3G Ⓟ ... **Ciba**
Fenanthren Golden Orange 3G ... **G**
Indanthren Golden Orange 3G ... **FBy**
Indanthrene Golden Orange 3GA ... **G**
Indanthrene Golden Orange 3GF ... **G**
Indanthrene Golden Orange 3GWP ... **G**
Ponsol Golden Orange 3G ... ... **DuP**
Ponsol Golden Orange 3GD ... ... **DuP**
Sandothrene Golden Orange N3G ... **S**
Solanthrene Orange 3J ... ... **Fran**
Tinon Chlorine Golden Orange 3G ... **Gy**

Reactions on Cellulose
H_2SO_4 conc.— greenish blue

An example from the Vat dyes section of Part I is reproduced above and a specimen page (carbazole vat dyes) from the Anthraquinone section of Part II is shown opposite.

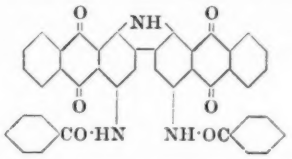
These two examples illustrate the information which will appear in Parts I and II and demonstrate the dual reference system which connects the two Parts, e.g.

C.I. Vat Orange 1 in Part I and **C.I. 69025** in Part II are complementary.

The format for the dyes in Part I will vary with the amount of information available. Some dyes will occupy a whole page, others only part of a page. For example, the space occupied by these notes will be used to accommodate information on **C.I. Vat Orange 2.**

SPECIMEN PAGE FROM PART II

69005 **C.I. Vat Green 9** (*Brownish grey → Dull olive*)



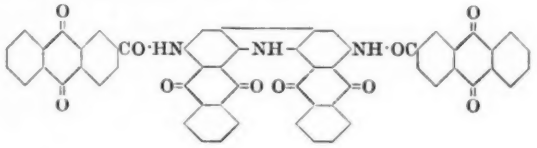
(*a*) Condense 1-benzamido-4-chloroanthraquinone with 1-amino-4-benzamidoanthraquinone in presence of copper and cyclise with chlorosulfonic acid
(*b*) Cyclise 4,4′-dibenzamido-1,1′-dianthrimide in sulfuric acid and oxidise the product

$Na_2S_2O_4$, alkaline — reddish brown; acid — yellowish brown

Discoverer — W. Mieg 1910
Bayer Co., *BP* 2702/09, 11932/09, 25986/09, 29352/10, 15753/12; *USP* 986521, 996109; *FP* 400653, 409407, 432449; *Sw.P* 55556; *GP* 220581, 225232, (*Fr.* **9**, 764, 1197), 228992, 239544, (*Fr.* **10**, 644, 638), 464292 (*Fr.* **16**, 1354)
Brit. Dye. Corp., *BP* 289191
BIOS 1493, 29; *FIAT* 1313, **2**, 135
FIAT 764 — Indanthrenoliv R
Vlies, *JSDC*, **30** (1914), 29
Fierz-David, 584 and Suppl. 82
Houben, 466, 662
Mayer, 181
Fierz-David & Blangey, Table 19
Fraser-Thomson, *JSDC*, **52** (1936), 242
Thorpe, **1**, 422

Soluble in *o*-chlorophenol
Slightly soluble in chloroform, pyridine
Insoluble in acetone, alcohol, toluene, xylene
H_2SO_4 conc. — red; on dilution — flocculent olive green ppt.

69010 **C.I. Vat Green 22** (*Olive*)

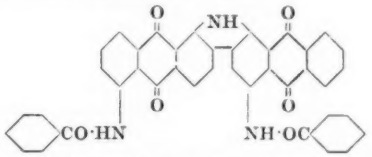


Condense 4,4′-diamino-1,1′-dianthrimide with 2 mol. 2-anthraquinonecarbonyl chloride and cyclise

Discoverer — F. Baumann 1929
I.G., *BP* 349714; *USP* 1819014; *FP* 696423; *GP* 513608 (*Fr.* **17**, 1398)
BIOS 1493, 28
FIAT 764 — Indanthrenoliv 3G

H_2SO_4 conc. — yellowish brown
$Na_2S_2O_4$, alkaline — reddish brown; acid — brownish yellow

69015 **C.I. Vat Brown 5** (*Brown*)



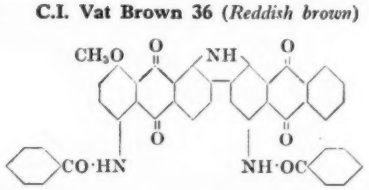
Condense 1-benzamido-5-chloroanthraquinone with 1-amino-4-benzamidoanthraquinone in presence of copper and cyclise with sulfuric acid

$Na_2S_2O_4$, alkaline — reddish brown; acid — yellowish brown

Discoverer — W. Mieg 1910
Bayer Co., *BP* 2702/09, 11932/09, 25986/09, 29138/09, 29352/10, 15753/12; *FP* 400653, 432449; *GP* 220581, 225232, (*Fr.* **9**, 764, 1197), 228992, 239544, (*Fr.* **10**, 644, 638), 491428 (*Fr.* **16**, 1349)
Brit. Dye. Corp., *BP* 289191
BIOS 1493, 10, 12; *FIAT* 1313, **2**, 106
FIAT 764 — Indanthrenbraun R, FFR
Fierz-David, 576 and Suppl. 82
Mayer, 181
Fraser-Thomson, *JSDC*, **52** (1936), 243
Thorpe, **1**, 422

Slightly soluble in xylene
H_2SO_4 conc. — dull wine red; on dilution — reddish brown flocculent ppt.

69020 **C.I. Vat Brown 36** (*Reddish brown*)

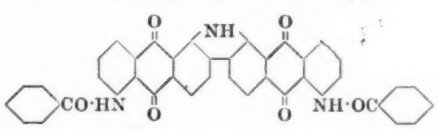


(*a*) Condense 1 - amino - 4 - benzamidoanthraquinone with 1 - benzamido-5-chloro-4-methoxyanthraquinone and cyclise
(*b*) Condense 1 - amino - 4 - benzamidoanthraquinone with 1 - benzamido-5-chloro-4-hydroxyanthraquinone, methylate the hydroxy group and cyclise with sulfuric acid

Discoverer — F. Baumann 1926
I.G., *BP* 298696; *USP* 1885172; *GP* 481362 (*Fr.* **16**, 1326)
BIOS 1493, 44
FIAT 764 — Indanthrenrotbraun 5RF
Fox, *JSDC*, **65** (1949), 513

H_2SO_4 conc. — violet; on dilution — red
$Na_2S_2O_4$, alkaline — brown; acid — brown (yellower)

69025 **C.I. Vat Orange 1** (*Yellowish orange*)



(*a*) React 5,5′-dibenzamido-1,1 -dianthrimide with sulfuric acid and oxidise
(*b*) React 1-benzamido-5-chloro-anthraquinone with 1-amino-5-benzamidoanthraquinone in the presence of nitrobenzene and cupric chloride

Discoverer — P. Fischer 1910
Bayer Co., *Sw.P* 115114
Cassella Co., *GP* 239544 (*Fr.* **10**, 638), 249000 (*Fr.* **11**, 621)
BIOS 1493, 15, 77; *FIAT* 1313, **2**, 119
FIAT 764 — Indanthrengoldorange 3G
Fierz-David Suppl. 82
Thorpe, **1**, 423

Slightly soluble in nitrobenzene, tetralin, xylene
Insoluble in alcohol
H_2SO_4 conc. — greenish blue; on dilution — orange
$Na_2S_2O_4$, alkaline — yellowish brown; acid — yellow

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Hudson-Mohawk Section ——

THE USE OF RESINS AND PLASTICS IN TEXTILE FINISHING*

HUGH H MOSHER
Arkansas Company, Newark, N J

INTRODUCTION

ALTHOUGH the mechanical finishing of textiles is almost as old as textile manufacturing, chemical finishing is a relatively recent innovation, which is sometimes assumed to date from the First World War. Several important chemical finishing operations, however, antedate the period of the First World Conflagration. Cotton goods have been sized with starches for centuries, and occasionally gums or glues, and a little tallow or stearic acid soap were added to the "size pot" to convert some sleazy fabric into a saleable piece of merchandise. Moreover, mercerizing and tin weighting, two important finishing operations, have been in use in textile processing for a number of decades. The prewar developments were but isolated advances and exercised but little influence on modern finishing practices.

Prior to World War I textile processing was a relatively simple operation. Fabrics, for the most part, were derived from just three fibers: silk, wool and cotton. Silk was employed for the preparation of luxury fabrics, wool for apparel in which warmth was of paramount importance, whereas cotton was used in making general-utility merchandise. Silk was used almost solely by the wealthier portion of our population as its high cost priced it out of the range of the bulk of our people.

The First World War disseminated, temporarily at least, much greater wealth to the great mass of our citizens and a means of gratifying an innate desire for personal adornment. Women were no longer satisfied with the utilitarian fabrics made of cotton. They demanded fabrics made of silk, the badge of wealth, and silk materials became a feminine necessity for party and eventually street apparel.

When recessions in the prosperity of our people occurred after the war, manufacturers of luxury apparel made every effort to retain their war-expanded clientele and bring the price of silk fabrics, and particularly silk hosiery, down within the buying capacity of the average person. This was accomplished by the fabrication of lighter, more flimsy silk constructions, which were subsequently weighted and sized to simulate the handle and drape of more costly materials.

H H Mosher

Resins in textile finishing are assuming a role of ever-increasing importance. After listing the objects of textile finishing, the author explains what natural and synthetic resins are chemically, what curing means, and how various thermosetting and thermoplastic types may be employed to attain different finishing effects on fabrics of different kinds of natural and synthetic fibers. The use of resins in attaining crease resistance, freedom from static, fabric stabilization and different kinds of hand are especially discussed, and also the application of resins on the newer hydrophobic fibers.

To the surprise of the industry, some of the finishing ingredients, used initially only to increase the weight and bulk of silk fabrics, were found to have a beneficial action on the life of the textile. This stimulated interest in chemical finishes, and fundamental finishing studies were instigated.

This interest was accelerated at about this time by the appearance of synthetic fibers. Rayons, after early vicissitudes, were beginning to meet with popular acceptance. Rayon is a chemist's product, reared in chemical laboratories, and its technologist and those responsible for its development made use of every artifice and scientific advance to extend the usefulness of their creation. Departures from conventional textile-processing practices were required to produce fabrics of acceptable quality, and the conservative textile industry accepted modified finishing practices and corrective finishes to mask inherent defects in rayons.

The demonstrated merits of chemical finishing in silk and rayon processes in the early twenties resulted in the evolution of textile finishing from an empirical art into something more nearly resembling a science.

Almost every textile fabric today is submitted to some type of chemical finishing operation, usually to a joint mechanical-chemical process.

The objectives of finishing are diverse and are usually designed to accomplish one or more of the following functions:

1. To impart some new property or characteristic to a fabric, e g, water repellency, fire retardance, water adsorbency.
2. To accentuate or subdue some inherent fabric characteristic, e g, to supply enhanced softness or luster or partial or complete dullness.
3. To correct weaving irregularities and structural defects, accomplished by combinations of film-forming finishes, pigments and lubricants.
4. To extend the life and usefulness of a textile, as with, e g, dimensional-control resins or film-forming resins to protect fabrics against mechanical abrasion.
5. To increase resistance of dyes to fading, as with dye fixatives, resins, or fume protectors.
6. To simulate with inferior fabrics the hand, and appearance of more costly merchandise, as with film-forming finishes, pigments, or weighters.

Most of the earlier finishes and finishing treatments produced only transcient effects on textiles and, whatever benefits they did produce, were lost during the first laundering operation. They were used as a sales adjunct and actually gave the consumer very little benefit. The durable finishes, those that might be expected to survive on a textile during its normal life expectancy, have been extensively used only during the past two decades. Properly tailored resins and their precondensates are the keys to many durable finishes.

RESINS FOR TEXTILES

Resins constitute an important division of organic chemistry and one that is assuming ever increasing importance. Resins are either man-made (synthetic) or products of nature, but their chemistry is so intricate and complex that they were produced syn-

* Presented at Jack's Restaurant in Albany, N Y, on Friday, Dec 5, 1952.

thetically and applied in industry and in the arts long before we had concepts of their chemical structure.

Resins may be defined as chains or bundles of organic radicles or molecules held together by chemical bonds and valences. The size of the resin molecule, or molecular aggregate, may be truly astounding. A single resin molecule may contain from fifty up to tens of thousands of atoms; some of the largest molecules are almost large enough to be visible under the electron microscope.

Thousands of resins occur in nature and man has synthesized thousands more in his laboratories.

The actual synthesis of a resin is usually a relatively simple operation. Almost any organic compound that contains unsaturated linkages and/or carbon oxygen unsaturation may be polymerized or resinified, usually by the application of heat and the presence of a suitable catalyst. To produce a resin which promises any hope of commercial success, however, the chemist is limited to the use of relatively inexpensive materials, for example, to phenol, formaldehyde, urea, ethylene, acetylene, glycerol, phthalic anhydride, styrene and petroleum.

Almost all synthetic resins start their existence as simple organic compounds and build up into one of several standard molecular architectural patterns. These resin precursors, or building blocks, as they are sometimes called, contain unsaturated bonds or reactive radicles and react in such a manner that valence saturation never occurs.

Typical of resin formation is the polymerization of ethylene into polyethylene. Ethylene is a simple unsaturated chemical compound, which has the chemical formula $CH_2 = CH_2$. The carbon atoms of the ethylene molecule are joined by double bonds. Under ordinary atmospheric conditions the compound is reasonably stable. At elevated temperatures and particularly in the presence of a suitable catalyst one of the bonds that unite the carbon atoms may be assumed to unlock as indicated by the equation:

$$CH_2 = CH_2 \rightleftarrows —CH_2— CH_2—$$

The modified ethylene molecules are very unstable and react with most reactive chemicals or even with each other if there is nothing else to combine with. This is illustrated by the following equation:

$$—CH_2—CH_2— + —CH_2—CH_2— \longrightarrow —CH_2—CH_2—CH_2—CH_2—$$

An examination of the dimer formed by reaction of two ethylene molecules shows that the unsaturation of the monomer has not been satisfied by polymerization and chains composed of ethylene molecules can be extended indefinitely (*mono* means *one*, *di* means *two*, *poly* means *many*, and *mer* means *part*).

Polyethylene resins containing as many as thousands of carbon atoms have been synthesized. The resins are simply open chains of methylene radicles containing reactive ethylene structures on the terminal ends. Most resins do not have as simple a structural pattern as the polyethylenes. Chain patterns composed of two or more different building blocks are common. Such structures have their different component molecules follow each other in a regular design. Thus, monomethylol urea, the simplest product formed by union of urea and formaldehyde, polymerizes to form linear polymers of the following structure:

—U—M—U—M—U—M—U—M—U—M—. . . .

in which U represents a urea molecule, and M the methylol linkage.

Chemistry does not limit itself in its resin formation to simple chain structures. Three-dimensional resins are common. The chemical building blocks, instead of arranging themselves in chains like strings of pearls, spread in three directions and produce fantastic chemical patterns, some of which look like the steel framework of a modern skyscraper.

This difference in the architectural design of resin molecules produces products of very different properties and causes resins to be subdivided into two classes: thermoplastic and thermosetting. Thermoplastic resins usually have a linear polymer structure. These resins melt and soften on exposure to heat and remain in that state until cooled, when they regain their initial condition. Thermosetting resins, on the other hand, are changed and in other ways modified by temperature; they usually harden and are converted into infusible solids.

The factors that determine the chemical and physical properties of a resin are the characteristics of its structural units and the molecular design of the resin. As resins may be looked upon as simply chains or aggregates of like molecules, it follows that the chemical properties of the structural unit are also possessed by the polymer though usually to an attenuated degree. The physical properties that a resinous product possesses can often be predicted from the complexity of its molecule and its architectural design.

The properties possessed by the intermediate chemicals formed in the gradual transformation of a monomeric molecule into a highly polymerized resin, follow a similar pattern. The initial products of polymerization resemble the parent molecule. The intermediate is usually either water- or oil-soluble depending upon whether it is derived from a hydrophilic (water-loving or hydrophobic (water-hating) base, it is usually devoid of film-forming properties and it is not a resin in the accepted definition of the term. As the intermediate increases in complexity, its solubility decreases and it begins to possess film-forming properties. The films produced by the less complex molecules are usually soft and pliable. With increasing complexities in the resin, the films produced from the intermediate become progressively firmer, harder and more brittle. Eventually, the resin is no longer capable of producing films. The films shatter and crumble into discrete particles and may act as organic pigments and even as dulling agents.

It was the film-forming properties of resins that initially attracted chemists and finishers to their application on textiles. As most resin groups progress through the same gamut of film-forming intermediates, it might appear that almost any resin of the same molecular size and architecture would be equally serviceable and interchangeable for finishing purposes. Actually, the finishing effectiveness of a resin depends upon the adhesiveness of its film to a fabric, its anchorage to the textile and its orientation upon the periphery of the component yarns and fibers. Differences in resin adhesiveness may be illustrated by two examples with which many of you are familiar. Gelatin, which is a natural resin, when dried on glass attaches itself with such tenacity that the surface of the glass can be pulled away before the glue film is released. Conversely, those of you who are philatelists are aware of the ease with which latex-backed stamps can be attached to stamp albums and windows and removed. Latex of the type used on stamps, like gelatin, is a natural resin. It forms a weak attachment to surfaces and would not constitute an effective textile finish. This illustration is not intended as a condemnation of latex finishing on textiles but only as a comment on the type of rubber cement used by stamp collectors.

Although two classes of synthetic resins exist, and hosts of members from each class have been proposed for textile finishing, the number in actual use is really quite limited. The thermosetting resins are of far greater importance at this time, and the thermoplastics have only recently established their merit.

The synthetic resinous products most extensively used in textile finishing are the following:

THERMOSETTING RESINS

1) Urea- or melamine-formaldehyde resins or their equivalents.
2) Alkyd resins.

THERMOPLASTIC RESINS

3) Polyvinyl resins.
4) Polyacrylates and methacrylates.
5) Polystyrenes.

To these must be added the cellulose ethers and esters. Members of this last subdivision are not true synthetic resins and will not be discussed in this paper.

UREA-FORMALDEHYDE RESINS AND THEIR EQUIVALENTS —— Urea-formaldehyde resins and their melamine-formaldehyde equivalents are the most important and most versatile of the synthetic-resin textile-finishing agents. The fully polymerized resin is synthesized stepwise from simpler intermediate polymers, and many of the intermediate polymers possess sufficient stability for industrial use. As a consequence, a whole gamut of stable resins can be produced from the same precursors: simple monomers, film-forming intermediates, and discrete polymer particles. Every type is useful for textile finishing: the monomers for crease-proofing and for use as corrective sizes, the film-forming intermediates in supplying weight and body to fabrics, and the completely polymerized resins as dulling agents and organic pigments. Even the resin precursors, urea and formaldehyde, are used in textile finishing: urea as a weighter and hygroscopic agent and formaldehyde as a dye and starch fixative, preservative and crush resister.

The urea-formaldehyde resins are essentially finishing agents for use on cellulosic fibers. They are without color and anchor themselves tenaciously onto viscose and cotton goods; the monomers and certain of the lower polymers are even capable of impregnating the peripheral wall of cotton and viscose rayon fibers to become, for all practical purposes, an integral part of the textile.

Urea-formaldehyde resins do not form a particularly adhesive attachment to the fibers of acetate rayon and the newer fibers like nylon and "Orlon" acrylic fiber and therefore receive but limited use in finishing textiles derived from these fibers. Melamine-formaldehyde resins, which bond better to hydrophobic filaments, are more extensively used.

Urea-formaldehyde resins are usually subdivided into at least four classes:

1. The precondensates, mono- and dimethylolurea.
2. The low and partially polymerized resins.
3. The so-called acid colloids.
4. Colloidal dispersions.

RESIN MONOMERS —— The simplest condensates of urea and formaldehyde are the methylolureas, monomethylol- and dimethylolurea. As such they possess very little finishing value, they simply act as precursors from which resins may be formed either on or within a textile fiber. They are usually applied to a textile with a catalyst, which transforms the monomer into a resin during a curing operation.

The methylolureas are used in textile finishing for the following purposes:

1. To impart crease-retarding properties to cellulosic fabrics.
2. To control fabric shrinkage dimensionally.
3. To produce durable chintz effects on textile fabrics.
4. To impart wash-resistant embossing effects on fabrics.

CRUSH-PROOFING RESINS——One of the major, and certainly one of the most ingenious, developments in the field of textile finishes is the crush proofing of cellulosic fabrics. Although cotton and rayon materials, from a volume-production standpoint, are the most important of our textile products, they possess one inherent weakness that has tended to restrict them from the field of luxury merchandise; they tend to crush and wrinkle easily. That defect, which has been shown to be due to a faulty intrafiber structure, was found capable of correction by the polymers derived from dimethylolurea.

The loose structure of the cellulosic filaments rendered the use of dimethylolurea feasible. Almost all cellulosic fibers, cotton, viscose rayon, linen, are composed of an internal core sheathed in a porous peripheral wall or skin. The apertures of the wall are of sufficient size to permit the ingress of water and small molecules. As a consequence, when cellulosic fibers are exposed to a solution containing dimethylolurea and a catalyst, the small monomer molecules diffuse into the internal micellar structure of the fiber, where they orient themselves and cross-link with the micelles and are polymerized by catalysts and heat into resins, too large to diffuse out through the pores. The development of the crush-retarding process was then unique among finishes in that the finish was deposited within rather than upon the surface of fibers.

But, as so often happens in industrial practice, the correction of one ill opened a veritable Pandora's box of defects. It was found that fabrics crush-retarded with dimethylolurea tended to develop malodors, were often tender and brittle, showed poor resistance to mechanical abrasive agencies, were cut by needles during sewing and adsorbed chlorine from hypochlorite bleach baths. Quite an array of defects.

However, the crush-retarding effects secured on certain classes of merchandise were so superlative that the defects were tolerated and left to the future for correction.

The perfection of the crush-proofing operation started nearly twenty years ago and is still in the process of development. Research to circumvent the defects induced on cellulosic fabrics by dimethylolurea during the process has been of two general types. The first aims to reduce the deterioration of cellulosic fabrics by improved processing methods and the use of corrective chemicals; the second, by the synthesis of advanced types of resin monomers.

Many of the defects inherent in the original Tootal, Broadhurst and Lee, or TBL, crush-retarding process have been minimized. Postcuring scouring operations are almost universally used today to eliminate odors; and the adverse physical conditions generated during the "proofing", such as fabric brittleness, tenderness, and susceptibility to abrasion, have been circumvented by the addition of lubricants like the silicone water repellents, "Zelan" and cationic softening agents to the dimethylolurea finishing solution.

Numerous resin monomers have been synthesized and proposed as possible dimethylolurea replacements, and, although some have found use in textile finishing and in industrial applications, few have proved interesting as dimethylolurea replacements for rendering fabrics crush-retardent. The proposed replacements include such materials as the methylols of acetone and hydantoin and the monomers of the thiourea-formaldehyde, formamide-formaldehyde and certain glyoxal complexes like tetramethylolacetylenediurea.

Monomers of acetone-formaldehyde resin, although they have but little adverse effect on the strength and elasticity of rayon and cotton, do not penetrate well into the micellar structure of fibers. They also discolor fabrics during curing. Most of the hydantoin-formaldehyde monomers do not polymerize into insoluble resins, and the initial crush-proofing effect is not fast to washing. Thiourea-formaldehyde monomers lack stability and decompose even when polymerized onto fabrics. Sulfuric acid may be one of the products of decomposition. The formamide-formaldehyde monomer, in spite of published German treatises to the contrary, has not proved a satisfactory crush-proofing agent. The writer has obtained excellent crush-proofing effects with tetramethylolacetylenediurea on both rayon and cotton goods, but our studies with this resin precursor are not yet complete. Of course, the melamine-formaldehyde monomers act as satisfactory crush retarers. For crush-retarding purposes, they possess approximately the same virtues and same inherent defects as the corresponding urea-formaldehyde monomers.

DIMENSIONAL CONTROL RESINS ——Although dimethylolurea was originally developed as a crush-inhibiting monomer, it was soon found that the "resin" possessed corrective finishing effects that far transcended wrinkle retardance. It imparted dimensional-control properties to cellulosic fabrics.

The discovery was a veritable godsend

to the textile industry and was of particular interest to the producers of spun rayons. Rayon fabrics, either those derived from staple or spun fibers, cannot be satisfactorily shrunk by mechanical means and stretch and become distorted in use. As a consequence, rayon was not very commonly used in heavier wearing apparel, such as women's coats and suits and men's sportswear and "tropicals" prepared from "spuns" were held in low esteem. Our concepts on the serviceability of rayon for heavy apparel have been profoundly altered by urea-formaldehyde finishes.

In contrast with the crush-inhibiting finishes, which are produced by intrafiber resin depositions, dimensional-control finishes may be oriented on the surface of fibers. External finishes are less inclined to effect adversely the strength and physical properties of a textile. As a result, cellulosic fabrics dimensional-controlled with resin are relatively free from the array of defects previously described under crush-retardant finishes.

Most any type of urea-formaldehyde condensate, the simple monomer, the low and higher polymer and even the so-called acid colloid, is satisfactory for dimensionally controlling viscose rayon and cotton goods. It is probable that the low polymers more effectively minimize shrinkage, though a more highly polymerized resin is more useful to reduce stretch and fabric distortion. The difference in effectiveness between the resins, however, is not great and is really of such little importance that trade demands for handle frequently govern the type of resin selected. It is possible, by the proper choice of urea-formaldehyde polymer and the addition of suitable adjuvents, such as cationic softening agents and water repellents, to produce dimensionally controlled fabrics of any ordinary commercial "hand" requirement from silk softness to full bodied crispness.

The mechanics of applying a dimensional control finish to a fabric is a simple operation, consisting simply in passing the fabric through a solution containing from 4 to 8% resin solids, a catalyst and possibly other auxiliaries. The wet material is then framed and dried at fixed dimensions. The dried resin is polymerized on the cloth by baking for a few minutes at 300°F. As in crush-proofing, malodors are apt to form during drying and curing. As a result, all fabrics dimensionally controlled with urea-formaldehyde should be washed in a dilute soap or synthetic-detergent solution, rinsed, and dried.

The ability of urea-formaldehyde condensates and their melamine-formaldehyde prototypes to inhibit textile shrinkage is by no means confined to cellulosic fabrics. The felting and shrinkage of woolens and worsteds may also be retarded by formaldehyde resins and particularly by certain methylated methlolmelamines. The modus operandi of wool shrinkage is very different from that of other textile fabrics and is the result of the peculiar structure of the wool fiber, which consists of a small central pithy core, sheathed in a fibrous cortical layer and covered externally with overlapping scales.

Although the cause of wool felting and shrinkage is still somewhat obscure, it is believed due to frictional differences which exist between the tip-to-root and root-to-tip direction of its fibers. The difference, which is attributed to the scaly periphery of the wool fiber, induces a rootwood movement of the individual fibers within the thread and eventually a tangled mass of locked fibers.

The reduction of this shrinkage in wool yarns may be accomplished either by removing its scales chemically or by correcting the inherent directional frictional differences in the wool fibers with finishes.

Correction of the frictional difference is secured with the methylate methylolmelamines. These resins, for reasons not very thoroughly understood, appear to anchor themselves and accumulate at the interstices of the scales where the greatest corrective action is exerted. Other urea- and melamine-formaldehyde resins also inhibit wool shrinkage but less effectively. Woolen fabrics with laundering shrinkages below 2% can be secured by methylated methylolmelamine resins.

DURABLE CHINTZ EFFECTS —— Although urea-formaldehyde polymers are probably the most versatile of finishing agents, none of the innovations that they have made in textile processing is as surprising as the fact that they impart durable chintz effects to cellulosic fabrics. Sheen has always been a desirable fabric characteristic, and surface luster is of particular esteem on certain types of decorative materials. Surface sheen, or a chintz effect, was formerly imparted to cotton goods with films of wax, sometimes wax-albumin, polished to a high luster on hot friction calenders. The effect was but transient and persisted only to the first laundering or dry cleaning. The use of chintzes has been expanded by the development of durable types, based on urea-formaldehyde monomers and polymers.

The production of a durable chintz is usually obtained by passing cotton goods, less commonly rayon fabrics, through a solution containing from 5 to 20% of dimethylolurea or a low-polymer urea-formaldehyde resin and a catalyst. Subsequent to impregnation the fabric is ordinarily dried in a tightly stretched condition to insure a surface film of resin. The chintz effect is secured by passing the dried impregnated fabric through very hot calender rolls, the resin film being simultaneously polymerized and polished.

The type of urea-formaldehyde polymer used to produce chintz fabric depends on the handle requirement of the finished textile. A soft pliable chintz may be produced from dimethylolurea or the lower polymers. The more highly polymerized resins produce a more bodied and stiffer fabric. Occasionally waxes, gums and even albumin are mixed with the resin in the finishing bath to produce special effects. Sulfated oils or an equivalent are almost invariably present in the finishing bath with the resin to prevent the sized fabric from sticking to the calender rolls.

DURABLE EMBOSSING EFFECTS—— Embossed fabrics are esteemed as ornamental textiles, but the older patterns lacked durability and were almost completely destroyed by laundering and were impaired by dry cleaning.

The popularity of textile embossing has increased by the discovery that urea-formaldehyde monomers and polymers durably set and affix patterns impressed onto fabrics by the embossing operation. As in the preparation of chintz, most any type of urea-formaldehyde monomer or polymer may be used in embossing; the lower polymers produce a softer hand to the embossed fabric, the higher a stiffer and more heavily bodied effect.

ACID RESIN COLLOIDS——The most highly polymerized urea-formaldehyde resins in common use in textile finishing are the so-called acid colloids. These are more commonly prepared from melamine-formaldehyde than from formaldehyde resins.

Acid colloids are usually formed by dissolving a lower polymer in water so as to produce a resin of a desired finishing concentration and by adding thereto about 3% of glacial acetic acid on weight of solution. A gradual polymerization of the resin occurs. After standing three hours the solution assumes a bluish opalescence, and after twenty-four hours, the appearance of skim milk. The dispersion of highly polymerized resin particles is suitable for textile finishing.

Although acid colloids impart excellent shrink-control properties to rayon and cotton goods, their most salient finishing characteristics are stiffness and durability. Over 75% of the added stiffness and body contributed to a cellulosic fabric by an acid colloid is still present after five cotton-type launderings. Such a durability cannot be matched by any thermoplastic resin that I have tested.

GENERAL FINISHING EFFECTS—— Although urea-formaldehyde and melamine-formaldehyde resins are most com-

monly used in finishing as correctives of fabric defects, they possess other finishing properties. As a class they impart a "buoyant", springy handle to textile fabrics, which resists removal by the usual laundering procedures. The body and fullness of the finishing effect depends on the complexity of the resin molecules. The lower polymers supply but little body to textiles; the higher, a fuller loftier handle.

Urea-formaldehyde resins are effective finishing agents for cellulosic and hydrophilic fibers, such as wool, but the bond, or anchorage, between this resin and the hydrophobic fibers like acetate rayon, nylon, Orlon, however, is poor. Fabrics derived from such fibers are therefore not satisfactorily finished with urea-formaldehyde resins. Certain melamine resins, on the other hand, bond well with hydrophobic fibers and find extensive application in finishing fabrics of acetate, nylon and Orlon acrylic fibers.

ALKYD RESINS——The only thermosetting resins other than urea- and melamine-formaldehyde which find extensive use in textile finishing are the alkyd resins. They are obtained by heating together phthalic anhydride, maleic anhydride or one of their homologues with glycerol, pentaerithrytol or a similar polyhydric alcohol. The resins of this class may be obtained in diverse polymeric states, the lower polymers producing a soft hand to textiles, the more complex a firmer, stiffer handle. Unlike the urea-formaldehyde resins the alkyds are not fabric correctives and are used in finishing to supply a textile with body and weight. The resins bond firmly with most types of textiles and particularly with the hydrophobes, acetate rayon and nylon.

The most interesting characteristics of alkyd-resin finishes is the transparency of the film that they form over textile fabrics. Alkyd-resin finishes are among the few that do not lower the luster of textiles. The resin is used chiefly as a ribbon finish.

THERMOPLASTIC RESINS —— Synthetic thermoplastic resins have been the most recent addition to the textile finisher's palette of finishes. The technological applications are far fewer, and general interest in this class of resins is much less than that of their thermosetting brothers. This likely is due to the fact that their finishing effects are much less striking and spectacular and they have been less advertised.

The thermoplastic resins are not normally applied to fabrics in a partially polymerized state and insolubilized and set by catalysts and heat; instead they are used as dispersions of thoroughly polymerized resin particles. The particles produce films over textiles and add body and weight. It is claimed that these films protect fabrics against abrasion and wear, and some screen out the actinic rays from sun-light, thereby protecting textile colors from fading and the fibers from atmospheric deterioration. I have been unable to discover scientific evidence to confirm this latter contention.

The types of handles that thermoplastics impart to textiles are very diverse, ranging from silky softness to sharp crispness. The difference depends upon the extent of polymerization, the particle size of the emulsified resin, the type of electrical charge on the colloid and other factors.

Thermoplastic resins of proper design often impart durable finishes to fabrics derived from hydrophilic fibers. However, much loss of feel occurs during laundering even when no loss of resin substance can be detected. It is believed that the film is plasticized or in other ways altered by the detergent solutions. It is claimed that the original stiffness of a washed resin-sized fabric may be restored by ironing, a contention with which I am not in accord.

I have not discovered any synthetic resin, either thermosetting or thermoplastic, which will produce durable finishing effects on the newer hydrophobic fibers, Orlon acrylic fiber, nylon or Dacron polyester fiber.

The only synthetic thermoplastic resins extensively used in textile finishing are the polyvinyls, either the alcohol, acetate or chloride-acetate copolymers, the acrylates or methacrylate and the polystyrenes.

The actual formation of thermoplastic resin-dispersions suitable for use in textile finishing is more of an art than a science and requires past experiences in resin making. The process usually consists in dissolving the resin monomer in an aqueous solution or an organic solvent-water mixture and adding thereto emulsifying or dispersing agents, protective colloids and a catalyst. By refluxing or other means the monomer is polymerized and remains suspended by the dispersing agents and protective colloids. By varying the factors influencing polymerization and altering the emulsifying agents, dispersions possessed with very different finishing properties can be secured.

The finishing of textiles with thermoplastic resins is a very simple operation. It consists merely in passing a fabric through the resin dispersion and drying in the conventional manner.

THERMOPLASTIC RESIN MONOMERS IN TEXTILE FINISHING——The monomers that polymerize into thermoplastic resins received very little consideration as possible precursors for intrafiber finishes up to a few years ago. It was then discovered that certain monomers are capable of penetrating the periphery of a wool fiber and resinifying within its structure to form intrafiber resins.

Wool has a compact fiber structure, though apertures do exist in its periphery. These orifices, however, are too minute to admit any but the smaller molecules, molecules as small as dimethylolurea even being too large to pass through the pores on the surface of a wool fiber.

Ethylene sulfide is one chemical with molecules small enough to diffuse readily into the wool micelles, and it can be polymerized and trapped within the fiber. The properties of wool are modified by this intrafiber resin, which plumps the wool, changes its dyeing properties, enhance its strength and favorably reduces its stretch in water.

The industrial application of ethylene sulfide to wool was found to present processing difficulties.

Methacrylic acid can be substituted for ethylene sulfide and form methacrylate resins within the wool fibers. This is accomplished by impregnating woolen fabrics with ferrous ammonium sulfate solutions, drying the treated material and exposing the dried material to a methacrylic acid solution containing a small amount of hydrogen peroxide. This process is receiving a limited industrial application.

POLYVINYL RESINS——It is probable that polyvinyl-resin dispersions are more extensively used in textile finishing than any other thermoplastic resin. Although many vinyl modifications are produced, only the acetate and alcohol have thus far assumed much importance in finishing.

Polyvinyl acetate bonds well with textile fibers and is used chiefly as a stiff and body-building finish for rayon fabrics, particularly for ninons and marquisettes when durable stiffness is required. Polyvinyl acetate films are claimed to screen out the actinic rays from the sun and to protect textiles and dyestuffs from deterioration by sunlight.

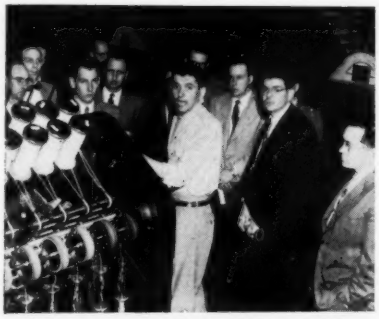
Polyvinyl acetate dispersions also receive limited use in binding pigments and as dulling agents for textile fabrics.

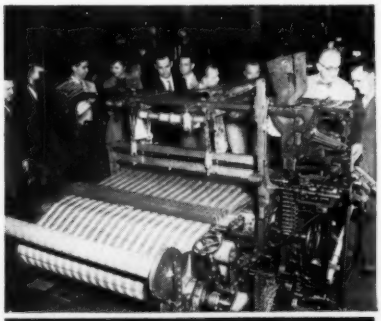
Polyvinyl acetate may be hydrolyzed to polyvinyl alcohol, which combines with boric acid to form a borate, an important nylon-yarn size. Polyvinyl alcohol is also used as a dispersing agent for certain non-durable water repellents and as an auxiliary in the preparation of polyvinyl chloride-acetate copolymers.

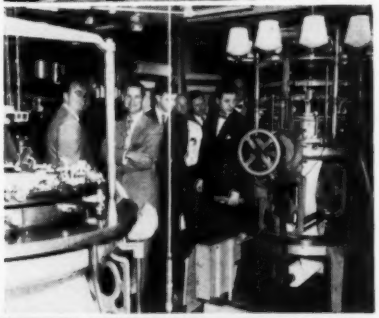
POLYACRYLIC AND METHACRYLATE RESINS —— Although the polyacrylic and methacrylate resins are among the oldest of our synthetic thermoplastic resins, it is only recently that they have assumed industrial importance. They are most extensively used in the finishing of nylons, particularly nylon hosiery. The

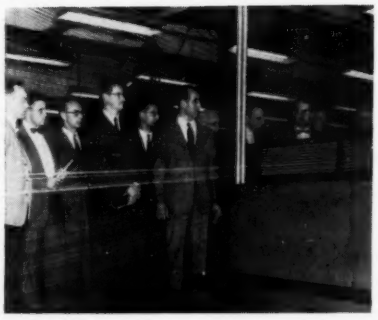
(Concluded on Page P410)

PHOTOS TAKEN DURING VISIT OF THE PHILADELPHIA SECTION TO THE TEXTILE RESEARCH DEPARTMENT, AMERICAN VISCOSE CORPORATION, MARCUS HOOK, PA, ON APRIL 17, 1953. **(See Secretary's report on page P314, May 25th issue).**









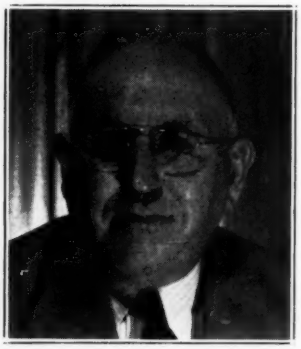
Philadelphia Section ——

HYDROGEN-PEROXIDE BLEACHING OF TEXTILE MATERIALS*

H G SMOLENS

INTRODUCTION

DURING the past twenty years, textile bleaching with hydrogen peroxide has taken tremendous strides forward, mainly because of the development and refinement of the cold bleach process, the steam bleach process, and the white-scour process. Interestingly enough, all three processes were developed in the Philadelphia area, perhaps inevitably, for Philadelphia has long been a leader in textile bleaching with hydrogen peroxide, and all three processes are, after all, related in their dependence upon the bleaching action of hydrogen peroxide. A previous survey of hydrogen peroxide bleaching (*1*), given in April 1952, sketched the origin and background of these three processes; now they can be discussed in some detail with examples of present-day applications.



H G Smolens

This is a discussion, in greater detail than previously, of the three peroxide bleaching methods that have already been reported by the author. The major applications of the cold bleach process are outlined and amplified. More historical details of the steam bleach process are given, and attention is directed to the differences between open-width and rope steam bleaching. The white-scour process is outlined in greater detail, and dyeing information is given.

COLD BLEACHING WITH HYDROGEN PEROXIDE

COTTON——The main use of the cold bleach process on cotton is in the treatment of piece goods and knit goods. Cold bleaching is of excellent value in preparing cotton piece goods for dyeing or other finishing that does not require a full bleach. The standard procedure is to apply a fairly strong hydrogen peroxide solution containing caustic soda, silicate of soda and a suitable wetting agent to the grey goods in a two-, or preferably three-roll, pad. The squeeze must be good enough so that the wet-out goods do not drip. After saturation the goods are folded down or rolled up, covered so they will not dry out, and allowed to steep. There is little or no actual bleaching done in the pad, as the temperature is kept around 70°F and the cloth is in the bleaching solution only a small fraction of a minute. A definite lightening of the color is noticeable in about ten or fifteen minutes, and the brightening continues for at least eight hours. Under normal conditions the goods are usually steeped overnight. Then they are washed well and dried, except where they are to be jig-dyed with colors that are dyed on wet cloth. The exact formula to be used is determined by local conditions and requirements, but the important factor is the disintegration and decolorizing of the motes in the grey goods to the extent that they are not visible after dyeing or finishing. It is not necessary to desize the grey goods, unless size-free goods are specified. In fact, one of the best values of the cold bleach process on cotton is that it effects a minimum loss of weight. There are records of 2.50-yard-per-pound drills going to only 2.65 after cold bleaching and dyeing in contrast with their going to 3.05 after a caustic scour, light bleach and similar dyeing. In many cases the saving in finishing and weighting chemicals more than pays for the chemical cost of cold bleaching. Although the first application of cold bleaching of cotton was on drills and ducks for mineral dyeing, the preparation of similar goods for vats and sulfurs followed shortly. However, it was necessary to learn how to get satisfactory money value out of vats, because the cold-bleached goods were nonabsorbent. Later came the use of cold-bleached goods of all kinds, from one-yard sateens to seven-yard lawns, for pyroxylin and other coating and for rubberizing. A large yardage of lightweight goods that had to meet a high Elmendorf tear test after dyeing and coating was cold-bleached during the war, because cloth prepared this way easily met such tests. Now, cold bleaching is being successfully done on almost every type of cotton fabric, including pile fabrics and goods for napping, in almost every finishing plant in this country.

Cold bleaching of cotton knit goods was first tried in 1938 on the standard rayon Tube-tex processing machine, but, to get satisfactory results, deeper pans and lighter pressures had to be used. Now a considerable amount of knit goods, both all-cotton and cotton-rayon, is being bleached by this process. The white is excellent, the mote removed, very good, and, most important of all, the bleached cloth has a softness and elasticity just about like the grey goods. Although the chemical cost is somewhat high and the operations are somewhat cumbersome, with better washing facilities available in the average knit-goods bleachery, more of this type of bleaching would be done. The procedure is the same as for piece goods, but the washing has to be better as the washed goods are the final product.

WOOL & WORSTED——The main use of the cold bleach process on wool is in the treatment of worsted top and felt hat bodies. A fair amount of yarns and piece goods is also being done.

The first important application of cold bleaching to worsted top was in an all-aluminum top-dyeing machine. This machine was being used for top bleaching in the routine method in which the top was scoured, rinsed, warm peroxide-bleached and washed. Two lots per shift were considered good production. With the switch to cold bleaching, the production was more than doubled, but, even more important, the quality of the bleached top was so much better that higher counts of yarn could be produced with better yields. Either ball top or top wound on spools can be handled equally well. The unscoured top is saturated, by means of some circulating system, with a fairly strong alkaline hydrogen peroxide solution, drained as well as possible without any special suction,

* Presented at Kugler s Restaurant in Philadelphia, Pa, on Friday, Dec 5, 1952.

then laid aside to steep for about eight hours. A standing bath is used to keep chemical costs down. The bleached top is put back in the machine for washing or run through the back-washer.

The cold bleach process on wool felt hats has been in use for about twenty years. The procedure is similar to that of all-cold bleaching, that is, a saturation of the felts with an alkaline hydrogen peroxide solution, either in one bath or in two separate baths, an extraction (felts drain so poorly that they have to be extracted) and an overnight steeping. The bodies are then washed and tinted. This is the only peroxide felt-bleaching process that produces a white felt hat body that can be further shrunk. All warm felt-bleaching procedures produce a felt hat that is set, that is, will not shrink any more. What this means is that cold-bleached felts are in such better physical condition after the bleaching that they feel and look much more lively after the dry-finishing and stiffening operations.

RAYON——The main use of the cold bleach process on rayons is in treating piece goods, although some knit goods and top are also done in this manner. The grey goods, without desizing, are handled just like cotton piece goods, though with a milder bleaching solution. After steeping, washing and drying, they are ready for dyeing or other finishing.

MIXTURES —— Cotton-rayon fabrics, such as upholstery and drapery materials, are very nicely cold-bleached to good whites with excellent mote removal and with better retention of fullness and weight than is possible with any other known bleaching process. Wool or mohair mixtures with cotton or rayon or both can also be nicely cold-bleached without much trouble or danger of damage to the most delicate fibers.

The cold bleach process is very versatile and useful. It is most suitable where large yardages can be run at one time, but each finishing plant has to be guided by its own economics. The overall cost is reasonable and the operating techniques very simple.

STEAM BLEACHING WITH HYDROGEN PEROXIDE

OPEN WIDTH—A good deal of the original experimental work in steam bleaching, done in the Philadelphia area, was on open-width goods. This was partly because the co-operating plants handled only open-width work and partly because, in 1934, no one believed that the cost of kier-bleaching rope goods could be reduced by steam bleaching or any other kind of bleaching. At first the goods were steam-bleached right in the grey or after a partial desizing, but the evenness of bleaching and the dyeing quality of the cloth was not good enough. The next step was the use of the double steaming process, that is, first a steaming of caustic-saturated goods, then a wash, then a steaming of the same goods saturated with a suitable peroxide-bleaching solution and then a final washing. This procedure produced excellent bleaches on goods, such as drills, twills, ducks, etc, which are normally handled in open width if they have to be dyed, especially if dyed with vat or sulfur colors.

Various types of steaming and steeping devices were tried out for steam bleaching before the decision was made to use a vertical flue for preheating the goods and a scray in an insulated housing for the heat treatment or heat-soaking period required to develop the maximum brightness. When this type of equipment showed itself to be practical, an open-width J box with an attached preheating flue, all in an insulated housing, was designed and built in Philadelphia. The complete range consisted of a saturating machine with three dip rolls before the squeeze rolls, a J box with an enclosed overhead plaiter placed just ahead of a simple heating chamber, and an upright washer that looked somewhat like a water mangle with water sprays at each nip. Steam at 85 to 100 lb pressure was used for heating the running goods by means of perforated pipes extending across the width of the flue, one on each side of the goods. The speed was 60 yards per minute. The goods were run through twice, first saturated with caustic, then with peroxide. The results were excellent. The easiest item in the whole matter was the heating of the open-width goods. The main problem was with the passage of the goods through the J box. First it was found that there was no such thing as open-width wet goods unless there is tension at both ends. As soon as the goods left the plaiter over the J box, the tension as well as open-width control was lost, and the goods would curl, wrinkle, twist, etc. It became evident also that the width of the J box had to be somewhere near the width of the cloth being run. If there was too much leeway, the goods would lean to one side, build up against the edge of the J box and then fall over in the opposite direction. This made it hard to get the goods out of the J box without many wrinkle marks, bruises and other faults that showed up after dyeing. Finally, the goods, no matter how well heated they had been when they left the flue, lost some of this heat during the plaiting and folding down into the J box. To keep up the temperature level in the goods themselves it is necessary to admit steam into the J box to compensate for the loss.

After all these troubles had been pretty well corrected and everything was running well, the steam bleaching unit was put to war work, which was the desizing of number ducks for mildrew, flame and waterproofing. Then the problem of reducing the temperature of the cloth to a point at which the desizing enzyme was not killed came up. This was solved by the use of a steam exhauster in which air is sucked in by the steam stream in sufficient volume to bring the cloth temperature down to about 180°F. During the period between 1939 and 1943, while this steam bleaching unit was being used on civilian work, many finishing-plant executives visited the small building in which it was housed and watched its operation. The several open-width J box ranges set up in the early 1940's were based on this original steam bleaching range.

ROPE FORM —— Steam bleaching of goods in rope form, although started several years after that of goods in open width, paralleled to a large extent the latter work. It was found, for example, that double steaming, first with caustic and then with peroxide, was not only more satisfactory in general, but, in the case of goods for dyeing, quite essential. It was also found that getting goods in rope form well and evenly heated was not quite so simple a matter as is the case with open-width work. Much attention had to be paid to the correct squeezing of the saturated goods and the shape of the J box had to be right if tangles, cloth jams and resulting bruise marks were to be avoided. It was quickly learned that the speed at which cloth can be steam-bleached in rope form depends on washing efficiency, especially that of the first wash after the caustic steaming. Some improvements have been and are being made in washing equipment. Probably the biggest help in this connection is the wet-bottom J box operation, first tried out in 1941, but just now coming into its own as a valuable steam-bleaching operational aid. The important factors in steam bleaching are well-designed, good-quality equipment, skillful operation and intelligent supervision. Where these are all present, costs are a minimum and quality, a maximum.

Everyone knows that a very large percentage of all cotton goods being bleached today is going through a steam bleaching process of some kind. In spite of differences and variations in routing of goods, in quality and operation of the several kinds of equipment in use and in local conditions, an excellent job of bleaching is generally the case. It really is something to see well-bleached cloth that was in a singe bin at 8 AM going into a white bin about 2½ hours later, or to look at production sheets showing more than

500,000 lb of wide sheeting being done in one steam bleaching range in a single 120-hour week.

THE WHITE-SCOUR PROCESS

The original purpose of adding hydrogen peroxide to the last bowl of a wool-scouring train was to make the scoured wool look whiter and cleaner than it does after a normal scour. If just hydrogen peroxide is added, the alkali carried into this bowl with the scoured wool will quickly raise the pH and cause various troubles. First of all, it can decompose the peroxide because of the alkaline bleaching action that will take place on the wool going through the bowl; and in a short time the solution in the bowl will foam, boil and become wild. Second, it can allow the wool to carry into the dryer an alkaline peroxide content, which can not only harshen, but even materially damage the wool at the usual dryer temperature. Third, it can cause variation in shade, especially if a tint is being used to further enhance the appearance of the wool. So it is customary to add acid, usually sulfuric acid, to keep the solution in the last bowl at an acidity that will do at least two things: 1) neutralize the alkalinity carried over by the scoured wool and 2) maintain enough total acidity in the last bowl so that the pH of the wool after drying will not be too high. The chemical control of this procedure is very simple and can easily be effected.

After quite a few years of white scouring of clothing wools, similar work was started on carpet wools. Because of the naturally darker color of the carpet wools, higher peroxide concentrations were required to get satisfactory brightness improvement. It was found that such a peroxide treatment not only brightens these wools but also improves the carding, spinning and dyeing qualities of many of them. There is apparently some modification of the wool structure that can be of definite advantage if not carried too far. When the white scouring of carpet wools started, it was fortunate that those who had to dye this scoured wool were experienced in the dyeing of peroxide-bleached wool, so that they were able to overcome, without too much trouble, some dyeing difficulties that appeared. It seems that some sort of addition products of wool protein and hydrogen peroxide are formed at the peroxide concentration level used in this white scouring. These may not respond to the usual titanium-sulfate test and so are not easy to detect. They are not readily washed out with water, but are easily removed by treatment with small amounts of bisulfite, hydrosulfite or catalase, which can be used without effecting the dyeing of the wool. If these traces of peroxygen compounds are not removed, they can get into the dye bath and change the shades produced by some acid colors, especially blues. The maximum brightness of white-scoured wool may not appear until the wool has been in the bin more than 24 or even 48 hours. It is good practise to allow at least 24 hours of bin time on white-scoured carpet wools before dyeing, and, even then, they should be given the residual-peroxide-removal treatment, just for safety.

CONCLUSIONS

Each of these three processes has its own particular values and areas of maximum effectiveness. All are solidly entrenched, having proved themselves under varying circumstances in far-flung areas. Yet, it seems that their full potentialities have not yet been realized and that there are still many applications waiting to be made. It is the individual problem in the individual plant that has led to sweeping improvements in the past. It is logical to expect future developments to spring, to a large extent, from the same source—— practical application to a specific problem.

REFERENCE

(1) Smolens, "Hydrogen-Peroxide Bleaching of Textile Materials", *Am Dyestuff Reptr* 41, P575-77, 580 (1952).

Use of Resins and Plastics in Finishing—

(Concluded from Page P406)

lower polymers are used as body-building sizes to add weight and body to hydrophobic fibers; as the higher-polymer films crumble to dust upon the application of pressure, they are used as dulling agents in hosiery finishes. Polymethacrylate resins also render nylon hosiery snag-resistant.

POLYSTYRENE RESINS —— Polystyrene resins are more difficult to plasticize than either polyvinyl acetates or methacrylates. This has inhibited and delayed their acceptance as a textile finish. They can be produced in many degrees of polymerization and produce a wide variety of handles to textile fibers. They are not commonly used alone as a textile finish, but usually as an additive to glues, gums and starches. The resin is receiving importance as a rayon-yarn size.

FORECAST

The use of synthetic resins in textile finishing is still in its infancy. The thermosetting resins have already established themselves as corrective finishes and have produced unexpected and spectacular finishing effects. Comparable progress has not yet been achieved with the thermosetting resins, but shadows of things to come are just beginning to be forecast.

It is known that the films produced from the extremely high polymers are so brittle that they shatter into dust or discrete particles. These dusts are beginning to be utilized as dulling agents in the nylon-hosiery industry. At least one company is using the higher polystrene polymers instead of talc to mask reediness in cotton sheeting and pillow-case fabrics, but the chief uses of advanced types of resins probably will be corrective finishes.

Synthetic resins may be defined as but chains or bundles of reactive molecules containing unsaturated valences. The unsaturation permits attachment of other chemical radicles to the resin. If the resin is a type that will durably bond to a textile, any corrective chemical attachment to the polymer might be expected to confer some characteristic effect. If the radicle attached is strongly hydrophobic, a durable water repellent might be formed; if an inhibitor of static, it might function as an antistatic finish; and if the radicle attached is fire-retardent, a flame-resistant finish might be attained.

These conclusions are not based on present realities but are simply shades of things to come.

New York Section Report

THE annual business meeting of the New York Section was held on Friday evening, May 22nd, 1953 at Kohler's Swiss Chalet, Rochelle Park, N J.

Chris W Farrell reported on plans for the outing to be held on June 19th. George A Jonic, Treasurer, reported a balance of $681.06 as of May 1st, 1953. Patrick J Kennedy, Chairman of the Nominating Committee with Henry L Young and George L Baxter as members, nominated the following slate of officers for re-election:

Weldon G Helmus—*Chairman.* John H Hennessey—*Vice Chairman.* George A Jonic—*Treasurer.* Norman A Johnson—*Secretary.*

These officers were unanimously re-elected.

Two papers were presented during the technical session: "Actate/Dacron and Acetate/Wool Unions" by Dr Victor Salvin (speaker), Dr Paul Studer and George Ward of the Celanese Corporation of America and "The Effect of Atomic Weapons on Apparel Fabrics" by Charles W Dorn of J C Penney Co. Mr Dorn's presentation also included showing of the movie "Operation Doorstep", official motion picture of the March 17th atomic explosion.

The attendance was approximately 250.

Annual Student Chapter Night—Rhode Island Section

THE Annual Student Chapter Night of the Rhode Island Section was held on May 22, 1953 at the Providence Engineering Society, Providence, R I. An informal dinner at the Sheraton-Biltmore preceded the meeting.

Ernest J Chornyei, Chairman, presented to selected senior students from each of the textile schools in the Section, the 1953 Rhode Island Section Book Award.

Speakers of the evening were Edmund J Dupre, associate professor of textile chemistry, New Bedford Textile Institute, on "A Textile College—Its Aims and Its Purposes"; and Gilbert M Congdon, Jr, director of public relations, Rhode Island School of Design, on "Design in Your Life."

Approximately 60 members attended.

Respectfully submitted,
R G THOMAS, *Secretary*

RHODE ISLAND SECTION MEETING OF APRIL 24, 1953—RUMFORD, R I

Photos by John E Trezise

ONE HUNDRED AND EIGHTY-SIXTH COUNCIL MEETING

April 17, 1953

Hotel Statler, New York, N Y

THE Council held its 186th meeting in the Hotel Statler, New York, N Y, on Friday morning, April 17, 1953. Present were President J Robert Bonnar, presiding; Arthur T Brainerd and Samuel L Hayes, *Vice-Presidents;* William R Moorhouse, *Treasurer;* Charles W Dorn, *Chairman of the Research Committee;* Carl Z Draves, C Norris Rabold and P J Wood, *Past Presidents;* Edward B Bell, Elmer E Fickett and Sawyer F Sylvester representing Northern New England; Raymond W Jacoby, Thorwald Larson and Alden D Nute representing Rhode Island; Raymond J Carey representing Western New England; John J Hanlon representing Hudson-Mohawk; Carl H Brubaker, Weldon G Helmus, Patrick J Kennedy, Paul J Luck and Henry L Young representing New York; Carleton E Anderson, Edward C Diehl, Ange E Raimo, Ernest E Rettberg, Jr, Richard B Stehle and Percival Theel representing Philadelphia; Walter M Scott representing Washington; Joseph Lindsay, Jr, Henry A Rutherford and R Hobart Souther representing Piedmont; C Russell Gill and H Gillespie Smith representing Southeastern; Arthur I Hultberg, Joseph H Jones and Samuel Klein representing Mid-West; Kenneth H Barnard and Eric W Camp of the Committee on Conventions; George L Baxter of the Corporate Membership Committee; William A Holst of the Committee on Constitution and Bylaws; Leonard S Little of the Executive Committee on Research; Albert E Sampson, *Assistant Treasurer;* George H Schuler and Glenn D Jackson, Jr of the Publicity Committee; Edwin I Stearns; Harold W Stiegler, Research Director; and H C Chapin, *Secretary.*

The Secretary's report of the 185th Council meeting and financial report of March 26, and the Treasurer's report of April 1 were accepted. The Assistant Treasurer was voted the same authority as the Treasurer to order purchase or sale of securities for the Association. An appropriation was made to cover the maximum estimated cost of manufacturing a new supply of light fastness standards, still under negotiation by the Committee on Light Fastness.

The following proposals to amend the Bylaws were made by the Committee on Constitution and Bylaws, in order to bring the Bylaws into closer conformity with present informal practice. Conditional upon the adoption of the first group of these amendments, the Council elected Leonard S Little chairman of the newly defined Research Committee, to accord with his present office of Chairman of the Executive Committee on Research, and Charles W Dorn, Vice Chairman of the Executive Committee on Research as well as Chairman of the newly named Technical Committee on Research.

In Article IV, Section 1, after "an Executive Committee on Research," insert "a Technical Committee on Research."

For Article IV, Section 2, substitute, "The Research Committee named in Article V of the Constitution shall be the Executive Committee on Research, of which the Chairman, appointed by the Council, is a member of the Council. The President of the Association, and the latest living Past President, shall be members ex-Officio. The Vice-Chairman of this Committee shall be the Chairman of the Technical Committee on Research, appointed by the Council as provided in Section 3 of this Article. In addition there shall be six Senior members appointed by the Council, each for such term, not exceeding five years, as will permit each year two new appointments for terms of three years each. No such appointed member shall serve in that capacity more than five years consecutively. No one may serve as Chairman of this Committee more than five years consecutively.

"This Committee shall be responsible for the general research policy and program of the Association, and for the organization and operation of the salaried research staff."

Remove Section 12 of Article IV and substitute a new Section 3 as follows. The present Section 3 will then be renumbered 4, and the rest consecutively.

"The Chairman of the Technical Committee on Research shall be appointed by the Council after nomination by the Executive Committee on Research, but no one shall be appointed to serve in this capacity more than five years consecutively. Subject to approval by the Executive Committee on Research, he shall appoint members of the Technical Committee on Research; members of the active subcommittees as required to carry on specific research projects, and Chairman of these subcommittees after consulting with their members; Chairman of other subcommittees to which technical inquiries on various subjects may be referred, such committees to be designated as 'reference subcommittees'."

"Each active subcommittee shall have a Secretary, appointed by its Chairman. Each active subcommittee shall report

SECRETARY'S FINANCIAL REPORT—MARCH 26, 1953

	Applications	*Dues, regular & reinstate*	*Dues, Corporate & Sustaining*	*Miscellaneous*	*Totals*
Received and transmitted to Treasurer August 1 to December 30, 1952	$2,217.00	$35,142.50	$23,662.50	$6,435.75	$67,457.75
December 30, 1952 to March 26, 1953	1,551.00	8,371.00	22,845.00	3,269.48*	36,036.48
Total in fiscal year to date	3,768.00	43,513.50	46,507.50	9,705.23	103,494.23
Leaving deposited by Treasurer with Secretary					8,634.86
For comparison, receipts to March 28, 1952	3,976.50	42,155.25	43,877.50	12,174.98	102,184.23

* Miscellaneous items

Dividends and interest	$682.70
Reporters and reprints	93.30
Dry cleaning kit	1.00
Year Books	344.70
Crockmeters	551.49
Crock cloth, commissions	252.74
Multifiber cloth, commissions	563.30
Moth cloth, commissions	89.00
Cotton skeins, commissions	52.20
Launder-Ometer royalties	145.00
Water test apparatus	63.00
Dyed standards	82.30
Knitted tubing	42.00
Gas fading units	44.35
Buttons	4.00
Color transfer charts	101.25
Analytical Methods	129.40
Grease wool	27.75
	$3,269.48

H C CHAPIN,
Secretary

to the Technical Committee on Research at least twice a year, and shall submit a written report for publication at least once a year. No member may be Chairman of more than one active Research subcommittee at one time, nor a member of more than three active Research subcommittees. A person shall not serve as Chairman of an active Research subcommittee for more than three years consecutively, but may continue as a member.

"The Technical Committee on Research shall hold at least three meetings in every year, which shall be called by its Chairman at the direction of the Executive Committee on Research. Unless otherwise specified by the Executive Committee on Research, the Chairman of the Technical Committee on Research shall be responsible for contact with other committees of the Association on technical matters, and for coordinating all cooperative research with outside organizations."

In Article IV, the present Section 9, substitute "Chairman of the Executive Committee on Research" for "Chairman of the Research Committee".

In the phrase of Article III, Section 4, referring to approval of payments by the Treasurer, which now reads, "—; except that all expenditures for research shall, in addition, require the written approval of the Chairman of the Research Committee, or in the event of his absence or disability, the Chairman of the Executive Committee on Research," substitute "—; except that all expenditures for research shall, in addition, require the written approval of the Chairman of the Executive Committee on Research, or in the event of his absence or disability, the Vice-Chairman".

To Article XIII add a new Section 2 reading, "It is the policy of the Association to make its test methods available to everyone writing specifications or legislation, but no one is authorized to endorse any specifications or legislation in the name of the Association or any of its committees".

Mr Little reported appointment to the General Research Committee of H Y Jennings, Jules Labarthe, Jr, Linton G Ray, Jr, F T Simon, R L Stutz, J F Warner and J A Woodruff. He mentioned the latest Research Bulletin, number 4, which is a progress report on comparison of sunlight and Fade-Ometer fadings. Mr Bonnar's Committee was continuing its conferences on dyeing formulas for army uniforms. The Committee on Flammability of Clothing Textiles had been reactivated for supervision of work on a test sample holder now in progress at Lowell. Dr Stiegler discussed other work at Lowell on analysis of fiber mixtures, an abbreviated gas fading test, wash fastness and dimensional change.

Mr Baxter reported a gain over last year in corporate membership receipts, which he attributed largely to the efforts of three Sections. He expressed hope that efforts would be extended to other areas.

Professor Theel, reporting for the Publications Committee, stated that he expected the 1953 Year Book would be mailed in August. A membership application blank will accompany each book. "Application of Vat Dyes" was reported ready for delivery. The Committee is investigating why only half the number of papers presented before local Sections reach the Reporter for publication. Professor Ethel L Phelps was appointed Chairman of the Committee on this year's American Dyestuff Reporter Award.

Mr Barnard presented a preliminary report from Philip S Durfee on the successful financing of the Boston Convention. Mr Camp reported over 80 percent of the exhibit space at Chicago already sold. An ample number of bedrooms would be reserved. A few more technical papers would be accepted by Elliott Morrill. Mr Gill reported plans already under way for the Convention of September, 1954, in the Atlanta-Biltmore.

For the Perkin Centennial committee Mr Jacoby presented the following, which was adopted:

"Moved that the American Association of Textile Chemists and Colorists sponsor a Perkin Centennial to honor the discovery of the first synthetic dye by Sir William H Perkin in 1856. This Centennial to be held in New York at the Waldorf Astoria Hotel in the week of September 10, 1956. This Centennial to be in the form of a comprehensive program which will include the annual convention of the American Association of Chemists and Colorists and participating cooperation of other professional organizations. This Centennial to be conducted by the Executive Committee composed of members of the American Association of Textile Chemists and Colorists and by subcommittees made up of members of the American Association of Textile Chemists and Colorists or of American Association of Textile Chemists and Colorists members and representatives of cooperating organizations. The American Section of the Society of Chemical Industry is to be invited to make their presentation of the Perkin Medal during the Perkin Centennial".

For the Committee on Membership and Local Sections, Mr Hayes recommended that the new Washington Section include the District of Columbia, Maryland and northern Virginia. This was approved. Also approved were Bylaws from the new Student Chapter at the Rhode Island School of Design.

Elected to Corporate membership were:

Anchor Thread Company
Blue Ridge Textile Co, Inc
Duofold, Inc
Industrial Rayon Corp
E Richard Meinig Company
The Nolde & Horst Company
Portland Woolen Mills, Inc
Reading Dyeing Company
United States Rubber Co

Each of the following was elected to the class of membership indicated:

SENIOR

Ahern, T G
Ahl, F H, Jr
Aristizabal, B
Benesch, K
Bigio, L
Boyle, M M
Brewster, H R
Bruce, T D
Brupbacher, E
Burke, O W, Jr
Burnett, B F
Burnett, L S
Campbell, W M
Carson, S
Carter, W
Chamberlain, R
Clarke, R A
Cone, A W
Connors, L C
Converse, G F
Cote, R J
Cousins, W
Crowell, A E
Cruickshank, A M
Dabrowski, J
Dale, F W
Dare, D E
Davis, A E
Delbaugh, A E
DeWitt, C C
Di Battista, P J
Diem, M H
Donohoe, E J
Donovan, T J
Durnan, J W
Elisio, B
Epstein, D I
Evans, R D
Fetscher, C A
Finch, P F
Finkelstein, I
Fryml, J S
Genet, R
Gilbert, W S
Gillie, S J
Hallinan, M R
Hankins, E L
Herbert, E S
Hobart, M S
Holton, W A
Hrast, A A
Jaffe, R C
Johnson, D E
Johnston, D C
Kaplan, P
Karcher, R E, Jr
Kaufman, E L
Kaufman, S A
Keen, J L
Keever, B M
Koerber, J A, Jr
Krammes, R R
Krasny, J F
Kunze, W
Laestch, E J
Lee, J J
Leighton, L F, Jr
Lipman, D H
Listrani, A
Little, H L
Lowry, W S
Lynch, W A
Mangum, G D, Jr
Marsh, P B
Martegani, A F
Martin, W J
McCann, C P, Sr
Miller, E L
Mitchell, A E
Moore, J
Morgan, J P
Nassau, C
O'Dowd, C G
Olenkiewicz, P
Opie, N J
Padgett, R
Panciera, H R
Patton, R J
Patton, R F
Pay, S
Phillips, A
Pilton, W J

Pistone, J H
Powell, C R
Puller, C A
Reeves, W A
Reilly, C S
Remsen, J M
Rickard, G C
Robinson, C A
Robinson, E A
Rogers, J S
Rowland, C S
Sarantis, E N
Sayles, H A
Scroggie, A G
Sharpe, G A
Sheffler, L W
Shieldkret, D
Smith, L
Smoogen, A
Smyth, J A
Stephenson, J M
Steward, R E
Strawderman, F
Sundeen, H A
Thomas, H L
Thompson, L
Tomlinson, W F
Turner, F H
Van Daven, W F
VanKerckhove, P R
Venturini, T T
Vermeire, J L
Von Goebler, H C
Waller, D G
Waterworth, A
Waywell, J G
Wertheim, J H
Wild, L J
Williams, S G
Wilson, S A
Young, F L
Zonnenberg, J

JUNIOR

Adkins, A H
Ang, J L
Bost, C C
Chamberlain, R J
Compton, J D
Cordahi, G E
Exman, H I
Fogarty, J E
Gwin, B A
Greenberg, R M
Haimchick, M
Heppe, R W
Hines, S
Holt, L E
King, G W, Jr
Lentz, J
Manevich, C
Martin, S J, Jr
Meadows, R H
Moses, K
Pedersen, G F
Robison, S M
Rychalski, E
Sappington, R S

ASSOCIATE

Arbelaez, B R
Brawer, M
Brawer, O I
Breen, A R
Brown, T P
Case, A H
Coe, J T
Cook, K W
Copeland, A J
Degler, O K
Del Peso, L
Goodale, C F, Jr
Granby, L S
Hamilton, C
Hand, T F
Hatsuzuka, Y
Hiester, R E
Jones, E R, Jr
Kranstover, H F
Lard, E W
Lee, D E
Marston, P
Mattson, R H
Nantz, J D
Orloff, S
Osborn, H C
Pearse, R C
Peppers, H C
Rasero, L J
Riley, L J
Ryan, J F
Smith, R H
Vales, J
Weisberg, H
Zotti, G B

STUDENTS

Boyles, J V, Jr
Clark, W K
Crummer, R R
Crummer, W J
Dowis, H G
Elam, W H
Freshwater, B N
Ghosn, H S
Haralampopulos, H
Howard, W C
Jackson, R A, Jr
Lopate, J L
Lopez, E J
Lundegard, M M
Mathias, W L
Mattison, J F
Metze, M E S
Morris, M A
Pack, C B
Roscow, A
Ruden, S I
Scrum, F F
Scull, J F
Sharma, D R
Skelly, J K
Stone, W O, Jr
Thomas, R B

TRANSFERRED FROM OTHER CLASSIFICATIONS TO SENIOR MEMBERSHIP

Armstrong, E B
Catania, L F
Connors, L C
Dabrowski, J
Davids, O
Eckert, E
Epstein, E J
Freeman, E A, Jr
Goerner, H K
Greene, E J
Grosse, E H
Hall, D E
Hilton, H R
Hushebeck, H R
Moren, R A
Neal, C R
Payne, W H
Picken, J C
Roberts, D R
Robertson, R G
Sumner, J K
Wardell, W A
Weiss, J J
Welsh, J M
Wolfe, H B
Worth, D L

Respectfully submitted,

H C CHAPIN, *Secretary*

Membership Applications

May 29, 1953

SENIOR

Charles E Bouthillier — Wool finisher, Jantzen Knitting Mills, Portland, Ore. Sponsors: T M Marshall, E B Brearley.

Robert E Davis — Chemist, technical demonstrator, E I du Pont de Nemours & Co, Inc, New York, N Y. Sponsors: C A Sylvester, V D Lyon.

Robert G Dittmar—Supt, dyeing, J & H Closgens Co, New Richmond, O. Sponsors: J Nerl, V H Lawrence.

D Leete Keefer—Tech rep, Naugatuck Chem Div of U S Rubber Co, Philadelphia, Pa. Sponsors: M A Noonan, F J Demaria.

Meredith F Parker—Chemist, E I du Pont de Nemours & Co, Inc, Deepwater, N J. Sponsors: J E Smith, D C Bacon.

James W Rice—Chemical engineer, rug cleaning research, National Institute of Drycleaning, Silver Springs, Md. Sponsors: J C Adams, G S Fulton.

Norman VanGorder — Textile Chemist, Celanese Corp of America, Summit, N J. Sponsors: F Fortess, V S Salvin.

Dewey E Veal—Hosiery dyer, Princeton Hosiery Mill, Princeton, Ky. Sponsors: L N Hurley, J O Sweitzer.

Helmuth Vits—Chemist, Cranston Print Works Company, Cranston, R I. Sponsors: R H Phillips, E W Lawrence.

ASSOCIATES

Robert Mattair—Mgr, New Products Development & Technical Service, Oldbury Electrochemical Co, Niagara Falls, N Y. Sponsors: L S Little, R H Stutz.

Dewey H Nelson—Mgr, Midwest Territory, Becco Sales Corp, Buffalo, N Y.

STUDENTS

Jack O Orr—Georgia Institute of Technology. Sponsor: C A Jones.

Edsel P Webb—Georgia Institute of Technology. Sponsor: C A Jones.

CORPORATE

Atlas Powder Company
The Springs Cotton Mills

APPLICATION FOR TRANSFER TO SENIOR MEMBERSHIP

William J Wyskoczka

June 2, 1953

SENIOR

Thomas B Boyd—Chief chemist, Valdese Mfg Co, Inc, Valdese, N C. Sponsors: A R Thompson, J C Steele.

William A Falconer — Works manager, Treforest Silk Printers Ltd, Pontypridd, Glamorgan, United Kingdom. Sponsors: C W Elliot, R C Geering.

Stephen F Kowal—Technical sales & plant mgr, Polymer Southern, Inc, Greenville, S C. Sponsors: C Hooper, R E Rettew.

Kenneth E Miller — Secretary, Augusta Chemical Co, Augusta, Ga. Sponsors: W B Amos, L M C Burkes.

John Sirbola — Assistant stylist, Pacific Mills, New York, N Y. Sponsors: L Fusser, C H Huggins, Jr.

JUNIOR

Francis S Skelton—Chemist, Product Research Dept, Procter & Gamble Company of Canada, Ontario, Canada. Sponsors: C C Urquhart, K A Lister.

ASSOCIATE

Stanley Porter, Jr—Technical salesman, American Cyanamid Co, Textile Resin Dept, Bound Brook, N J.

Milton Weinberg—Chemist, U S Customs Laboratory, New York, N Y.

APPLICATIONS FOR TRANSFER TO SENIOR MEMBERSHIP

William J Cooney
Robert E Cote
Robert W Deobler
John L Keenan

NEWS

View of new Wyandotte Chemicals Corporation Research Center at Wyandotte, Mich

• New Wyandotte Research Center Goes Into Full Operation

Wyandotte Chemicals Corporation's new Research Center at Wyandotte, Michigan, went into full operation early this month, permitting consolidation of the Corporation's current research and development activities while pointing to material expansion in its long-range program. Wyandotte, a 63-year-old producer of alkalis, is a major manufacturer of chlorine, soda ash and caustic soda.

The new laboratories were designed in detail to provide facilities in which the broad and varied research program of the Division could be carried out with maximum efficiency. The small wing of the laboratory houses the meeting room, administrative offices, scientific library and reading room, the patent attorney's office, and the Market Development Department. The two large wings contain research laboratories. Within the building are special areas assigned to research in radioactive tracers, electronics, organic and inorganic chemistry, sanitation and germicides, electroplating, physics and the entire area of commercial cleaning. The building, in the form of a modified "T" extends 322 feet along the street with a central wing extending back 176 feet and has a floor area of 76,000 square feet.

Robert B Sample, Wyandotte president, and Thomas H Vaugh, vice president, Research and Development, point out that the Center is symbolic of the Corporation's conviction that research is fully as important as sales, production, finance, or any other phase of a business. In the field of synthetic detergents, for example, Wyandotte's research developed the process used for the production of its alkyl aryl sulfonate type, Wyandotte Kreelon, and discovered and developed the production methods for Pluronics, a unique new series of nonionic detergents including the first commercial flake-form nonionic detergent. Wyandotte also pioneered in the development and use of carboxymethyl cellulose as a detergency promoter in the United States and is credited with making the first special grade of CMC available for this use here.

As one segment of Wyandotte research, the Laundry and Textile Research Department is engaged in the development of laundry detergents, bleaches, sizing materials, wool scouring products and many others. Their equipment includes highly specialized small scale washing devices, some developed entirely at Wyandotte, with accessory equipment, such as electrophotometers and reflectometers, special automatic equipment for the continuous production of standard soiled cloth, and a complete small scale commercial laundry including automatic washers, wash wheels, drying tumblers, centrifuge, steam press, etc. Completing the Laundry and Textile facilities is a constant temperature and humidity room set for the precise conditions required for the standardized evaluation of bursting strength and other important factors.

Wyandotte, a pioneer in the development of laboratory tests for evaluation of detergents for the washing of textiles, is presently engaged in the development of evaluation techniques employing radioactive isotopes, which are expected to throw more light on the complicated physical-chemical mechanism of detergency and thus permit further advances in this field. Other studies are pointed toward improvements of basic chemicals and specialties for use in the manufacture of textiles from natural and synthetic fibers.

• 500 Attend Dedication Ceremonies of New Ciba Plant

500 invited guests of Ciba States Ltd assembled on June 4 for the official dedication of the company's new $18 million vat dyestuff plant at Toms River, N J, where, it is anticipated, production of vat dyestuffs will be increased by approximately 4,000,000 lbs a year.

Although actual output of colors is still limited at the 1250-acre site, the plant is currently producing intermediates in volume for anthraquinone vat dyes. Approximately 300 employees will handle the initial work, it is learned.

Guided plant tours preceded the dedication ceremonies, which were held in the afternoon in front of the Administration Building.

Milton J Cross, acting master of ceremonies, introduced the following: Governor Alfred E Driscoll of New Jersey, Robert Kaeppeli, managing director, Ciba Ltd, Basle and president, Ciba States Ltd; Harry B Marshall, vice president of Ciba States Ltd, Toms River Division, and president of Ciba Co, Inc; A Paul King, Board of Chosen Freeholders of Ocean County (N J); Frank B Common, Queens counsel, and chairman of the board of directors of Ciba States, Ltd; Prof C J Burkhart, member of the board of directors, Ciba, Ltd, Basle; David B Dyche, vice-president and treasurer, Ciba States, Ltd and president of Cincinnati Chemical Works; G F Haines, executive vice-president, Ciba States, Ltd and president of Ciba Pharmaceutical Products; G Kuhn, director, Ciba, Ltd, Basle; A Ammann, director, Ciba, Ltd; F Max, general manager, Toms River Division; P Kronowitt, assistant general manager, Toms River Division; Clifford S Thompson, director, Ciba States, Ltd; and local clergymen.

Dr Marshall, in the introductory address, pointed out that, as a result of extensive treatment, the plant was discharging into the Toms River water of higher purity than that taken in.

Following the presentation of an honor scroll to Ciba by Mr King, Gov Driscoll discussed the mutual benefits of state-industry cooperation, paying tribute to Ciba in the selection of Toms River for the new plant.

Dr Kaepelli, expressing confidence in the American market, stated that the aims of the new organization were two-

fold: 1) to meet the standards of production set by Ciba's chemists and engineers through a combination of Swiss chemical "know-how" and American engineering skill and 2) to meet the social standards of industrial life in the United States today.

Ceremonies, in which the Stars and Stripes and the Ciba House Flag were raised at opposite ends of the grandstand, were featured in the program. Music for the event was furnished by the Asbury Park (N J) band.

• Burlington Completes Expansion-Modernization Program

Completion of an ambitious program of modernization and expansion at the Graham, N C plant of Burlington Engineering Co, Inc, has been announced by J Saunders Williamson, president.

Included in the construction program was the addition of 5,000 square feet of working space, the complete rebuilding of the front of the plant, the addition of a pilot plant for testing and experimentation, and the installation of a sprinkler system.

Burlington Engineering Company was incorporated in 1946. In addition to Mr Williamson, the president, officers are Edwin H Williamson, vice president, and W J Newcomb, secretary. The plant is located at the junction of Elm and Harden Streets (highways 49 and 54) in Graham.

The firm turns out several types of stainless steel dyehouse equipment, including becks, beam and package machines and pressure bleach, boiloff and dye machines for tricot, marquisette, laces and other open weave fabrics. The machines are designed by Burlington's staff of graduate engineers.

The most recent of the dyeing machines, including one for handling marquisettes and another for tricot fabric, have had extensive trials in dyehouses in the South and East. Engineered to boil off, bleach, and dye open mesh goods, the machines utilize standard package-dyeing principles but on a much larger scale.

The marquisette machine is said to handle up to 6,000 yd of 60-in goods, depending on the cloth construction. It employs a 1,000 gal/min pump equipped with a four-way valve for reversal of flow. Flexopulse timers are used in conjunction with temperature controllers.

Designed for operation up to 240° F, the closed-type machine is built of Type-304 or Type-316 stainless steel. Helicoid gauges are used along with either Allis-Chalmer or Worthington pumps. The unit is driven by Westinghouse or Allis-Chalmers motors.

The tricot machine is similar to the marquisette machine in appearance but is built to handle even wider goods. A four-way valve on this larger machine is optional. Both machines are available without the pressure-dyeing features. Atmospheric-pressure machines have continuous one-way flow.

Sampling and dye additions are taken care of on the pressure-type machines by a vertical 3-gal cylinder built into the system between the pump discharge and the return line. Samples are attached to a wire screen in the top portion of the cylinder. When it is necessary to take a sample, the cylinder is isolated by closing off two valves, the lid is removed, samples are lifted out, and any necessary add is made. The samples are then replaced on their bracket (above the level of the added dyestuff) and the top replaced. The sample kier is then opened into the system again.

The sampling and adding operation can be done without stopping the pump or reducing the temperature inside the unit.

Graham, N C, Plant of Burlington Engineering Co, Inc

A general view of the main fabricating room at Burlington Engineering Company, Inc. Workman is putting finishing touches on package dye vat in right foreground. Tricot machine is shown at left with continuous dye range in background.

• Cyanamid Fortier Plant Producing Sulfuric Acid

The first completed unit of American Cyanamid Company's Fortier Plant under construction in Jefferson Parish, La, is now producing sulfuric acid. The unit went "on stream" early this month, according to G J Forney, Plant Manager. Next to be completed, he said, will be the 100-ton-a-day ammonium sulfate facilities.

The plant, which is expected to be completed early next year, will produce from natural gas such nitrogen chemicals as ammonia, acetylene, hydrocyanic acid, and derivatives of these, including acrylonitrile and ammonium sulfate.

The entire plant, Mr Forney said, will embody numerous manufacturing processes unique in the chemical industry. It was designed and is being built by Chemical Construction Corporation, a Cyanamid unit.

• DHC Transfers

Transfer of headquarters and sales offices of the Pioneer Pump Division to 2750 Guardian Building, Detroit, Michigan, and transfer of manufacturing operations to a new plant in Paris, Kentucky, have been made by Detroit Harvester Company.

Production of the line of over 400 standard models of industrial pumps formerly manufactured in Detroit is already underway in the Kentucky plant.

• Three Patents Granted on Water-Dilutable Pigment Printing Colors

The result of many years of research and development in the field of water-diluted pigment printing colors has been climaxed by the granting of three patents to Dr Laszlo Auer, President of Aula Chemicals, Inc, Elizabeth, N J. The development is significant in that it places the water-dilutable pigment printing colors on a competitive plane with solvent-dilutable water-in-oil emulsions, especially insofar as color mileage and brilliance are concerned.

Colors produced according to the recently granted patents have achieved brilliant prints with extremely high color strength and excellent fastness properties, it is pointed out. The products are marketed by Aula Chemicals, Inc under the registered trademark of Aulabrite Colors.

Patent 2,637,621 covers resin emulsions with a new resin binder, namely, phenol-epihalohydrin condensation products. The new resins, when properly formulated, are said to impart to pigmented textile decorations greater resistance to laundering and dry cleaning and to chemicals in general. Textile printing plant equipment, such as print rollers, backgrays, and rubber blankets are readily washable with water. A short drying and heating cycle yields laundering resistance to the prints.

Patent 2,637,711 protects a pigment dispersion method which is largely responsible for imparting the excellent color mileage and brilliance characteristics.

The pigment-containing portion of textile printing compositions is normally marketed as a color concentrate. This is to be extended to the right shade with a clear emulsion. The extender clear emulsions, covered by U S Pat 2,637,705, regulate printing properties and intensity of shade. They are said to yield high color intensity, combined with great brilliance of shade, and to impart in a mixture with the Aulabrite color concentrates printpastes of great stability, thereby permitting high machine speeds in long runs with Aulabrite printpastes.

According to Dr Leslie L Balassa, Vice-President of Aula Chemicals, Inc, the Aula development is unique, because, at one time, it was considered impossible to equal or beat color mileage and brilliance of solvent-type colors at equal pigment content.

Aula Chemicals, Inc was founded by Dr Auer in 1947 when he began the research program which culminated in the above-mentioned patents. Dr Balassa joined the firm in 1949 as Vice-President and has contributed to the ambitious development program his vast experience in the textile printing field.

• Further Givaudan Expansion

Continuing the expansion of its plant facilities, The Givaudan Corporation has opened two additional floors to a new building erected in 1951. In announcing the addition to the plant, E R Durrer, President, stated that the new facilities greatly improve the operation of the factory and facilitate the company's services.

The new floors will house the executive offices of the plant as well as modern research laboratories and an engineering department.

Largest of the ten laboratories is the one used exclusively by the Analytical Department, the facilities of which are devoted to maintaining a chemical control of all material entering and leaving the factory. All finished products are subjected to olfactory examination and chemical analysis.

Several of the new laboratories are devoted to scientific research.

Another laboratory is used exclusively for bacteriological research and sales service problems of a biological nature, i e, bactericides, germicides, fungicides and other correlative types of microbiological problems. Features of this laboratory include an incubating room where cultures being tested are maintained at standard temperatures, and a sterile air room where experiments are conducted under aseptic conditions.

A new library contains several thousand volumes of scientific textbooks, journals and trade papers, an extensive patent file and a microfilm reader.

The stock room has adequate supplies of chemicals and laboratory apparatus, and facilities for glass blowing for the construction of special apparatus and general repair work. The stock room also handles the preparation and distribution of distilled water and ice.

• Price Increase in Winthrop Intermediate

An increase in the price of phenyl methyl pyrazolone, a dyestuff intermediate of the aminopyrine series, has been announced by the Special Chemicals Division, Winthrop-Stearns, Inc.

The rise, which became effective May 1, brings the price of the chemical to $1.70 per pound in standard 250 lb drums and $2.00 per pound in similar quantities.

Prices of phenyl carbethoxy pyrazolone and phenyl carboxy pyrazolone remain unchanged, according to Aaron Addelston, director of the division. The former will continue to sell at $4.00 and $3.60 per pound in amounts from one to 199 pounds, and 200 pounds and over, respectively. For similar quantities, phenyl carboxy pyrazolone is priced at $4.50 and $4.00 per pound.

• Foxboro Establishes New Instrument Firm in Mexico

With the organization of a Mexican affiliate, Graficas e Instrumentos, S A, The Foxboro Company of Foxboro, Mass strengthens its international service to users of industrial instruments for measurement and control. A key link in Foxboro's world-wide network, the new firm, located in Mexico City, has been incorporated for the future manufacture and assembly of instruments and instrument supplies. Its engineers, graduates of Foxboro's training courses, will handle all types of repair work, from simple adjustments to major overhaul.

The new concern has obtained factory facilities adjacent to Schultz y Cia, Foxboro's sales representatives in Mexico, establishing close co-operation between the two companies. Already in full production is the chart department.

The Mexican company is the third to join the list of Foxboro's international affiliates. Companies in London and Montreal for more than twenty years have manufactured virtually the entire line of Foxboro instruments.

• MIT Summer Course in Textile Research

A four-week Special Summer Program in the Principles of Textile Research will be given from July 6 to July 31 during the 1953 Summer Session at the Massachusetts Institute of Technology.

The program, which will be given under the supervision of Edward R Schwarz, Professor of Textile Technology, will deal largely with the role of fundamental research in textiles as it relates to the interpretation and handling of laboratory findings.

Further information and application forms may be obtained from the Director of the Summer Session, Room 3-107, Massachusetts Institute of Technology, Cambridge 39.

• New Degree at NBTI

A new degree, bachelor of science in textile design and fashion, has been authorized at New Bedford Textile Institute, New Bedford, Mass.

The Massachusetts board of collegiate authority said the advances in the development of man-made fibers have made it obvious that the apparel designer could not be as successful in the future as he has in the past with his minimum knowledge of textile materials.

Several young women enrolled in the course when it was first instituted will receive the first degrees in textile design and fashion at the 1955 commencement.

Joseph B Evans (left), toastmaster at the recent TCMA Annual Dinner, applauds the presentation of a $100 prize to Sarah S Schucker as the winner of the society's official seal contest. Victor H Berman (right) made the presentation.

Clyde D Marlatt, TCMA secretary-treasurer, is shown receiving from Victor H Berman an engraved watch in appreciation of his past efforts on behalf of the Association.

• TCMA Attributes New Pledges to Banquet, Publicity

A Textile Chemical Manufacturers Association spokesman has attributed a number of recent pledges of membership to the success of the Association's initial Annual Dinner under the new name, as well as to the publicity generated in the selection of an official seal.

Currently the TCMA boasts 14 full-fledged active members, which represent a large segment of the textile chemical specialties field. Originally founded in 1931 as the Sulphonated Oil Manufacturers Association, Inc, the organization changed its name to the Processing Oils & Chemicals Association, Inc in 1942. The most recent change, which is intended to more clearly define the scope of the Association, was made in December of last year.

At the Annual Dinner, held May 15 at the Hotel Roosevelt, New York, N Y, TCMA was urged by J Robert Bonnar, AATCC president, to make its accomplishments known to the public. Mr Bonnar credited members of the textile chemical industry with many contributions to fire- and water-resistant textiles, snag resistance, nonspotting, wrinkle resistance, the development of wetting agents, and solutions to problems of static electricity.

Sarah S Schucker of the Rhode Island School of Design was awarded the $100 prize for designing the official TCMA seal, Victor H Berman, Onyx Oil & Chemical Co, a member of the board, making the presentation. Miss Schucker was the winner among the contestants at 11 textile schools.

Walter F Fancourt, W F Fancourt Co, delivered the address of TCMA president Ernest E Rettberg, Jr, Scholler Bros, who was unable to be present because of illness.

In appreciation of his efforts as secretary-treasurer of the organization, Clyde D Marlatt received an engraved watch, Mr Berman making the presentation.

Joseph B Evans, Dexter Chemical Corporation, served as toastmaster. Arrangements for the affair were handled by John M Jester, Amalgamated Chemical Corp, and Mr Evans, co-chairmen; J Everett Allen, Arkansas Company, Inc; Martin B Friedman, Warwick Chemical Division, Sun Chemical Corp; and J J McGuinness, Dexter Chemical Corp.

J Robert Bonnar, president of AATCC, delivering his message to the TCMA.

Sarah S Schucker stands beside the poster which won first prize and which will be used as the official seal of the Textile Chemical Manufacturers Association. Miss Schucker was among contestants from 11 American textile colleges.

• New Quarters for Georgia Tech Physical Testing Lab

Through the generosity of the Textile Education Foundation, the A French Textile School at the Georgia Institute of Technology recently moved its physical testing laboratory into fully new and enlarged quarters. The new lab was made possible largely through financial aid from the Foundation, and was supplemented by school funds. It is located on the ground floor of the Hightower Textile Building.

Storage space was completely renovated into a constant conditioned lab, fully equipped with tables, shelves, cabinets, and fluorescent lights. Space is provided for both teaching and research at the same time.

A 15-ton fully automatic air-conditioning unit has been installed to control the temperature and humidity in the room in order to permit testing of textile fibers, yarns and fabrics under standard conditions.

• Solvay to Produce Chlorinated Methanes

A B Chadwick, President of the Solvay Process Division, Allied Chemical & Dye Corporation, announced plans on June 12th for construction of a plant to produce chlorinated methane products on property owned by the company near Moundsville, West Virginia.

It is expected that investment for buildings and equipment will exceed $2,000,000 and that construction will be completed in about ten months.

The new plant will have facilities to produce methylene chloride, methyl chloride, chloroform and carbon tetrachloride, marking Solvay's entrance into a new field of organic chlorinated chemical products.

Chlorine necessary for production of these chlorinated methane products will be supplied by Solvay's chlorine-caustic soda plant now being completed on the Ohio River just south of Moundsville, W Va.

EMERY CHEMICAL SALES MEETING

Seated (l to r): **R D Aylesworth, R F Brown, J P Clancy, W A Colby, L J Hadobas, A R McDermott, R J Roberts, H D Armitage, K K Boyd.**
Second Row: **J M Washburn, A Moore, N A Ruston, E L Spencer, J A Funk, L E Francis, W H Shields, T L Reiling, F L Ekstrand, J R York, A C Fusaro.**
Third Row: **J W Ritz, E V Sack, J P Kramer, C T Burgess, N F Reinert, W T Meinert, D R Eagleson, W J Siemens, V W Colby.**

L E Francis (extreme left), advertising manager, Emery Industries, Inc, congratulates winners of the company-conducted "idea" contest. (L to r): Mr Francis; L J Hadobas, San Francisco; F L Ekstrand, Philadelphia; H D Armitage, New York District Mgr; D R Eagelson, Chicago.

• Emery Chemical Sales Meeting Culminates Contest

The recent chemical sales meeting of Emery Industries, Inc, set the stage for the awarding of prizes culminating an "idea" contest for sales promotion and advertising. Of the sixteen prizes available, top money went to D R Eagleson, of the Chicago office. Second prize was claimed by F L Ekstrand of the Philadelphia area; third prize, by L J Hodobas, Los Angeles; and fourth prize, by H D Armitage, New York District manager. Judging was performed by Ruthrauff & Ryan, Inc, Emery's advertising agency.

H D Armitage became a double winner when he recorded low gross in the golf tournament.

This year, the participants in the technical sessions were the field men themselves. This exchange of field experiences, augmented by new data from the Development & Service Dept was designed to widen considerably their technical knowledge of Emery products.

The week-long meeting concluded with a visit to Emery's ozone-oxidation plant for producing dibasic azelaic acid and monobasic pelargonic acid.

• Lowell Textile Institute Name Change Becomes Official

On Monday, May 25, Governor Christian A Herter of Massachusetts signed the bill which changes the name of Lowell Textile Institute to its new designation, "Lowell Technological Institute of Massachusetts".

It is felt that the new designation is more suitable for the Lowell college since it implies a greater breadth in the Institute's services than did the former name. Departments of Leather Engineering and Paper Engineering have now become well-established at the Institute, and new departments of Electronics and Plastics are in prospect for the near future. All phases of textile manufacturing and textile chemistry will continue to play their important part in the program with no lessening of emphasis on either of these major fields.

• Colton Names Three New Distributors

The Colton Chemical Company, Cleveland 14, Ohio, manufacturers of polyvinyl acetate products and polyvinyl alcohol, have announced three new distributors for their products. Moreland Chemical Company, Spartanburg, S C, will distribute Colton products in the Southern textile area; Van Waters & Rogers, Dallas, Texas, in Texas and Oklahoma; Braun-Knecht-Heimann Company, San Francisco, Calif, in the Pacific West Coast states. These distributors will carry warehouse stocks of materials in their area for immediate delivery.

The Colton Chemical Company currently utilizes the services of the following sales agents: Leo P Coff, Edward R Dornoff Company, Harwick Standard Chemical Company and Polymer Southern, Incorporated.

• Pastore Chemical Lab Dedication

The new Pastore Chemical Laboratory of the University of Rhode Island was officially dedicated on May 15-16 with a special symposium on the theme, "Chemistry and the Progress of Man."

At the opening session Friday morning, May 15, W George Parks, head of the university's chemistry department, led a panel discussion on "Chemical Education in the Future." Panel participants included Prof Robert H Cole of Brown University; the Rev James W Hackett of Providence College; Prof Russell Meinhold, Rhode Island College of Education; Prof Robert L Ellin, R I College of Pharmacy; Prof William S Huber, R I School of Design and Sister Mary Constance, Salve Regina College of Newport.

Featured speakers at the ceremonies included Frederick G Keyes, emeritus professor of chemistry, Massachusetts Institute of Technology, on "Chemistry in Engineering"; W Albert Noyes, Jr Professor of chemistry at the University of Rochester, on "Chemistry in World Affairs", and Charles A Kraus, emeritus professor of chemistry, Brown University, on "Chemistry and Progress in Science."

The afternoon session opened with the dedication of the Joseph W Ince laboratory of organic chemistry, after which Farrington Daniels, professor of chemistry at the University of Wisconsin, spoke on "Our Future Sources of Energy", and Harry A Winne, vice-president of the General Electric Company, on "Atomic Energy."

Samuel T Arnold, provost of Brown University, gave the convocation address at 4 o'clock on "Future Supply of Scientists."

At the dinner meeting of the Rhode Island section, American Chemical Society, Warren B Blumenthal of the National Lead Company, presented a paper "The Applied Chemistry of Zirconium".

A Livingston Kelley, chairman of the Board of Trustees of State Colleges presided at the dedication ceremony Saturday morning. Following the welcome by President Carl R Woodward of the university, Governor Dennis J Roberts of Rhode Island extended official greetings.

Steven B Wilson, president of Fram Corporation, gave an address on "Science and Rhode Island's Economic Development", after which Architect John F Hogan and Alvan B Conway of the Rowley Construction Company, and Philip S Mancini, State director of public works, took part in the ceremony of the presentation of the key. Harold W Browning, vice-president and dean of the College of Arts and Sciences, officiated at the naming of the building, with U S Senator John O Pastore responding.

• Brownell Names New York Firm as GAF Legal Counsel

Attorney General Herbert Brownell, Jr has announced the selection of the law firm of Winthrop, Stimson, Putnam & Roberts of New York as legal counsel for General Aniline & Film Corporation, replacing the Washington law firm of Steptoe & Johnson. Mr Brownell points out that since GAF's head office is in New York, it would increase operating efficiency to have it represented by New York attorneys. The new attorneys will not receive a retainer, but will be paid on the basis of services rendered.

Arthur Andersen & Company were elected auditors for GAF for the ensuing year.

In the company's 1952 Annual Report to Stockholders, recently released by Jack Frye, President, the need for favorable action by Congress as soon as possible on legislation to permit the sale of GAF to private industry was again stressed.

Frye pointed out that despite Government control of the company and the handicaps resulting from this position, the former German-owned corporation, had sales in 1952 of $99,780,000, an increase of approximately $56,000,000 over sales in 1942, the year the company was vested by the Government. Net earnings in 1952 were $3,758,000 compared with $4,557,000 in 1951.

The report notes that the Ansco and Ozalid Divisions set sales records. The dyestuff and chemical operations of the General Aniline Works Division, GAF's largest manufacturing division, were hampered by the world-wide slump in the textile market. Operations of this division were further affected by a 110 day strike in the latter part of the year at the Rensselaer, N Y plant.

Net worth increased from $86,377,000 in 1951 to $89,402,000 last year and additions to plant and equipment during 1952 totaled $4,218,000. Export sales for the year were $7,225,000.

• Film on Industrial Colors

The first showing of a new motion picture film illustrating the use of colors in various U S industries was afforded the National Association of Printing Ink Manufacturers at its anual convention in the Shoreham Hotel, Washington, D C, June 1-3. Called "Color in Industry", the film was produced by The Hilton-Davis Chemical Company, Cincinnati, O.

The 16mm sound movie is filmed in color and has an approximate running time of 45 minutes. It highlights numerous applications of colors in such industries as cosmetics, printing ink, textile, paint and carbon paper. Shown also are scenes depicting Hilton-Davis' world-wide operations.

• Hussey Outlines ASA Steps to Protect Children from Flammable Clothing

Steps currently being taken to protect children from toxic paints and highly flammable clothing were recently outlined by Vice Admiral George F Hussey, Jr, managing director of the American Standards Association, as he pointed out that the Association's Sectional Committee on Hazards to Children has authorized technical subcommittees to set up safety standards on proper identification.

The subcommittee which will investigate the question of flammability of children's clothing will make use of an existing American Standard Test Method for Flammability of Clothing Textiles. (This test method has Class I flammability requirements.) Textiles conforming to Class I under this test method are considered of normal flammability, that is, having no unusual burning characteristics.

George M Wheatley of the Metropolitan Life Insurance Co, presided over a sectional committee meeting at ASA headquarters at which the two subcommittees were authorized. He is chairman of the American Academy of Pediatrics' Accident Prevention Committee.

• Production of Propionic, Butyric Acids Begun by Celanese

Celanese Corporation of America has begun large-scale production of both propionic acid and butyric acid for sale to general industry. Output is coming from the newly constructed special products unit at the Pampa, Texas, plant.

Celanese production of these chemicals is the result of an entirely new process developed by the Chemical Division's research laboratories. This process involves a one-step oxidation of natural gas components to acetic, propionic and butyric acids and other chemicals yet to be announced, and is the first of its kind.

As an implement to long range planning, Celanese recently announced the establishment of a Development Department to appraise all technological advances here and abroad which affect the varied manufacturing and research activities of the company. The unit will coordinate technical programs of both domestic divisions and foreign affiliates.

E T Powers, who has been associated with the administration of the chemical division of the company since 1945, has been promoted to the new position of Director of the Development Department.

• Rohm & Haas Cuts Price of Reducing Agent

A reduction of two cents per pound in the price of its sodium sulphoxylate formaldehyde reducing agent, Formopon, has been announced by the Rohm & Haas Company. The new price, which became effective May 20, f o b Bristol, Pa, is twenty-three and a half cents per pound in truckloads and carloads, twenty-four cents a pound in less than truckload drums. Formopon is supplied in powder or lumps for discharge and vat printing.

• NCSC Awarded Contract for Study of Raw Cotton Mercerization

A contract for a 2½-year research study on mercerization of raw cotton without tension has been awarded to the School of Textiles, North Carolina State College, by the Research and Marketing Administration, U S Department of Agriculture. USDA's Southern Regional Research Laboratory will supervise the contract.

The study, according to William A Newall, Research Coordinator of the School, will be three-fold: determination of the best method of mercerizing raw cotton without tension, determination of the best way to process cotton so treated on conventional textile machinery, and a study of the properties of treated fibers and of yarns and fabrics made from the treated fiber.

The work will be carried out at the School of Textiles under the supervision of Henry A Rutherford, head of the Chemistry and Dyeing Department, and J F Bogdan, head of the Processing Research Department.

• Ansul Fire-Training Classes

For the 10th year, fire-training school classes—each lasting three days—have been initiated by the Ansul Chemical Company on the company test field at Marinette, Wis.

With enrollment for each class limited to 25 persons, attendance this year will reach about 225—a new record. Last year approximately one-half of the enrollment was from metal fabrication or chemical companies.

Ansul's fire school draws its students from the fire and safety engineers of industry, from municipal fire departments and from the military services. The students are schooled in the latest techniques of fighting fires in flammable liquids and gases, using dry chemical and other types of extinguishers.

Dates for the remaining classes are: June 29-July 1, July 27-29, August 17-19, August 24-26, Sept 14-16, Sept 21-23.